ELECTRICAL REVIEW

Vol. CXLVI 30th JUNE 1950 No. 3788

Managing Editor: HUGH S. POCOCK, M.I.E.E. *Technical Editor:* W. O. FENWICK, M.I.E.E.
Industrial Editor: J. H. COSENS *Technical Consultant:* C. O. BRETTELLE, M.I.E.E.

IN THIS ISSUE

Electricity Supply Economics	1249
Power Convention	1251
Brazil's Five-Year Plan	1259
Views on the News	1260
Industry and the House. *By F. J. Erroll, M.A., M.P.*	1261
Parliamentary News	1262
Personal and Social	1264
A.S.E.E. Oxford Visit	1266
Recent Introductions	1267
Electrical Contracting. *By H. R. Taunton, A.M.I.E.E.*	1269
Overseas Electrical Trade	1273
Commerce and Industry	1275
New Books	1280
Recent Lighting Installations	1281
Financial Section	1282
Electricity Supply	1286
New Patents	1287
Contract Information	1289
Classified Advertisements	73
Index to Advertisers	83

EDITORIAL, ADVERTISING & PUBLISHING OFFICES: Dorset House, Stamford St., London, S.E.1. Telegraphic Address: "Elecrev, Sedist, London." Code: ABC. Telephone No.: Waterloo 3333 (60 lines). Entered as Second Class Matter at the New York, U.S.A., Post Office. Annual Subscription: Home and Overseas £3 6s. 0d.; U.S.A. and Canada $11.00. Cheques & P.Os. (on Chief Office, London) payable to ELECTRICAL REVIEW PUBLICATIONS LTD. and crossed "Lloyds Bank."

Streamline

sleek-line

suiting the modern scene

Flat backed and flush fitting—four high-lustre colour schemes—here is a heater abreast of the best in to-day's bathroom and kitchen design.

New Look
WATERHEATER

Berry's Electric Ltd.

4 Colours—Pastel Green, Cream, White, Pastel Blue. Fittings are chromium plated.

Touchbutton House, 86, Newman St., W.1

AUTOMATIC TIME CONTROL

T.21.

For Domestic Loads

The Sangamo Switch is a boon in any home or building, saving time and trouble, conserving fuel and power, and adding to comfort and convenience. Its many uses include automatic switching of corridor, porch, or lodge gate lighting, control of electric cookers, wireless sets, immersion heaters, etc., at any predetermined time and whether the occupier is "in" or "out". The Sangamo Time Switch is inexpensive, easily fitted and designed for a life-time of accurate service.

Sangamo Time Switches can be supplied for fixed "on" and "off" operations (with a maximum of three "on" and three "off" levers) or with Solar dial as illustrated, for automatically switching on at sunset and off at sunrise or between 8.30 p.m. and 1 a.m.

SANGAMO *Time Switches*

Sangamo Weston Ltd. Enfield, Middlesex. Tel.: Enfield 3434 (6 lines) & 1242 (4 lines). Grams.: Sanwest, Enfield
Depots at Glasgow, Newcastle-on-Tyne, Manchester and Wolverhampton.

ELECTRICAL REVIEW

Vol. CXLVI No. 3788 30TH JUNE, 1950

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872

Electricity Supply Economics

SIR HENRY SELF'S VIEWS

AFTER a distinguished and versatile career, Sir Henry Self has come into contact with electricity supply. He has brought an eager and studious mind to bear upon its problems, blending a new outlook with the professional experience of his technical colleagues. It is probably this different outlook that causes him to treat as discoveries a number of things which were matters of everyday acceptance before nationalization.

The "added incentive" of the public interest was always present in a service of which the greater part had for half-a-century been publicly owned. The obligation to expand was fully understood. The services of employees, first in the labour unions, later in the staff union had for many years been recognized.

It may be asked whether the security offered for capital is any more gilt-edged than municipal loans; the stocks of public utility companies, particularly those (like the railways) under obligation to render their services at controlled charges, with limited profits, have for a long time been available as trustee securities.

"Frills" and Amenities

Restraint is advised in the building of monuments and expenditure upon "frills." The latter term is applied to (among other things) gas-washing, and the considerable sums spent on equipment are mentioned, but the damage done by other forms of coal-burning exceeds that done by power stations. Electric heating is, moreover, making progress against the domestic fire and would make more rapid strides if purchase tax were removed. Amenity preservation is named as a cause of avoidable expense, but Poole and Connah's Quay, though expensive as sites because of the heavy outlay on civil engineering works, should surely not be quoted in a section bearing this heading.

Treasury Policy

It is satisfactory to observe the emphasis placed on the handicap which Treasury policy lays on the extension of electrical facilities and, thereby, on British industry as a whole. The case has to be urged constantly and with importunity, and it seems clear that this will be done.

Tariff unification will be good if (as seems to be the intention) it is applied with discretion. It is also good to have got rid of hypothetical generation costs; but it is not clear how close liaison and identity of interests between the Authority and the Area Boards will keep the power factor satisfactory. This, and many other points, will need further attention as opportunity occurs.

Sir Henry has absorbed the essentials of electricity supply and has presented his thoughts with a luxuriance of language natural in a classical philosopher learned in the law, divinity and mathematics; but was not Lord Citrine right when he said (as Sir Henry told the assembly), "Henry—this is too long"? And "Henry's" reply: "What I have written I have

written," was originally given by one who had written eight words and was asked to add to them. The paper contains well over twenty thousand words and careful perusal does raise the question whether its points could not have been thrust home in less than fifty-two pages.

CONTRACTORS AND CONVENTION

It was disappointing to find so little contractor representation at the Harrogate Convention, a circumstance due, we are told, to a misunderstanding about accommodation. Electrical contracting is a most essential branch of the electrical industry at present split between private and public ownership. It is possible for this dichotomy to continue but only if harmonious relations can be maintained. Already there exists a paper agreement between the two sides and in most Electricity Areas endeavours are being made to ensure that it works. But relationships could be considerably improved if further "contacts" were made at the Power Convention and it will be regrettable if the private contractors fail to seize this opportunity to demonstrate that they are an integral part of the industry and not merely ancillary to it.

SEATTLE SEQUEL

A declaration by the Mayor of Seattle that "trade is a two-way street" was followed by a decision of the City Council last week to invite tenders from British and other foreign firms for six transformers, part of the second instalment of the city's power programme. It will be recalled that six months ago the City Council rejected two British tenders although they were substantially lower than those submitted by American manufacturers. Later it approved a policy whereby American firms would have been given a 25 per cent advantage, but two days afterwards revoked this resolution, partly as a result of a visit to Seattle of the Marshall Plan Deputy Administrator, Mr. W. C. Foster, who pointed out that such action would undermine European faith in United States policy. It is suggested that the new contract is being regarded as a test of the ability of foreign firms to compete in the American market on equal terms, but this is rather prejudiced by the publicity given to the original tenders and the fact that the new contract is for similar equipment. Nevertheless, the change of attitude on the part of the Seattle authorities will be welcomed.

ELECTRICIANS' WAGE INCREASE

The National Joint Industrial Council for the Electrical Contracting Industry has agreed to an increase of 2d an hour for electricians in the London area and 1½d outside as from 3rd July, with proportionate rises for mates and younger workers. At the recent conference of the Electrical Trades Union it was resolved to put in a claim for 6d an hour. Both the Union and the National Federated Electrical Association consider that a payment-by-results scheme for the industry is impracticable, a view with which we feel we must agree. Only a collective system would be possible and such an arrangement would benefit the apathetic equally with the energetic, which would obviously be unfair.

ENGINEERING WAGES

Wisely the membership of the Amalgamated Engineering Union has decided by a large majority not to strike in order to enforce a claim for a £1 a week increase in wages. The two other principal members of the Confederation of Shipbuilding and Engineering Unions had already voted against strike action. With this threat removed the Engineering Employers' Federation will be able to consider any further representations which the unions may have to make regarding the revision of the wages structure of the industry. Generally it is felt that the wages of the lowest-paid workers should be increased but there is also a desire to maintain the "differentials" between skilled and unskilled.

Particulars of the careers and positions of about 2,600 leading men and women in all branches of the industry are contained in the "Electrical Who's Who" obtainable from *Electrical Review*, Dorset House, Stamford Street, S.E.1, or booksellers, price 12s. 6d. (postage 7d.).

Power Convention

Proceedings at Harrogate

ALTOGETHER the second British Electrical Power Convention held at Harrogate last week was a very strenuous affair for most of the 750 delegates from all branches of the industry and profession, and their ladies, but it cannot be doubted that their efforts resulted in a successful Convention.

One interesting function in addition to those which we mentioned in our last issue was a reunion on 19th June of past-presidents of the Incorporated Municipal Electrical Association. It took the form of a reception by Mr. F. Newey, deputy chairman of the Yorkshire Electricity Board (president 1942-44) at the Harrogate Hydro, after which tea was served. For the occasion a brochure containing a full list of presidents from 1895-96 to 1947-48 (more than fifty, many now deceased) was produced.

Sir Vincent de Ferranti's presidential address and Convention papers were dealt with last week. In this issue we report the discussions. Reports also appear of the annual dinner, the annual meeting and the E.A.W. luncheon. It was announced at the annual meeting that next year's Convention would be held at Brighton under the presidency of Sir Henry Self.

Annual Dinner

The annual dinner was held at the Hotel Majestic, on 22nd June, with the President in the chair. Sir Harold Hartley (chairman, Fourth World Power Conference), proposing the toast of "The Electrical Power Industry," said that the industry had inherited a great tradition and it was one which was based on scientific discovery coupled with the skill and experience of the engineer. The rapid development of the use of electricity had given a new social and industrial pattern to the world.

The industry had a great responsibility which it must face. Looking at the figures of world production generally, it was seen that the curve was beginning to bend over, but there was no sign of that in regard to the use of electricity.

The President, responding to the toast,

At the Convention dinner on Thursday last week

Sir Henry Self, Lady Hartley, Lady Self, the Mayor of Harrogate, Lady de Ferranti, Sir Vincent de Ferranti, Lady Citrine, Lord Citrine, the Mayoress, Sir Harold Hartley and Mr. J. W. Simpson

said it would be agreed that the Harrogate Convention had been a most successful one. The whole object of the Conventions was that all in the industry should meet together and find out what were the real problems to be solved. This year the Convention had concentrated on learning about what was happening and might well happen in increasing the efficiency of the conversion of the energy of the coal available in this country into useful work both in our industries and our homes.

The results of his week in Harrogate had left him just as much an optimist as he always had been. He hoped they would all leave Harrogate believing that we were moving rapidly towards the time when electricity would be available for all and that the productivity of the country, in consequence, would rise to heights which it had never known before.

Lord Citrine, who proposed the health of the guests, said he was an irrepressible optimist in regard to the electrical power industry.

The Mayor of Harrogate (Alderman C. E. Whiteley), responding, said that those in the industry must not regard their job as an end in itself. It must be regarded as a means to an end which was service to the public.

The President announced that, as the result of the golf tournament, the Electrical Industries Benevolent Association would benefit to the extent of £35.

Electricity Supply Economics

Discussion on Sir Henry Self's Paper

OPENING the discussion on this paper, Mr. A. M. F. Palmer (Employees' National Committee), referring to capital restrictions, said that governments had a habit of going where they were pushed, and the industry must blame itself if it did not push rudely enough. It must press its claim to a fair share of national capital resources and it should be emphasized day in and day out that electrification in the 1950's was fundamental to everything the country did.

Commenting on the need for good consumer relations and also good employee relations, he said he regarded the Consumers' Consultative Councils — with great respect to those serving on them—as a clumsy form of machinery. Financial balance should be achieved not by increasing prices but by reducing costs and having regard to the post-war conditions every endeavour should be made to keep prices to the consumer steady and ruthlessly to investigate costs. He regarded joint consultation between employers and employed and the establishment of advisory councils in the industry to be an inspired and vital development if properly understood and operated.

Mr. J. Eccles (Merseyside and North Wales Electricity Board) showed charts demonstrating the rise in the cost of plant, labour and materials since before the war. The coal cost per unit had increased by at least 280 per cent. The cost of steel, one of the basic materials of the industry had increased in the ratio of 3 : 1, the cost of electric cookers had increased to 180—taking 100 as the figure before the war. Yet the charge for electricity to the consumer had risen by only 12½ per cent. In some cases electricity was still being charged for at pre-war rates and this was a state of affairs that could not be expected to continue because of the higher capital cost of new plant. It seemed likely that the price per unit sent out from the station ought to rise by about 12 per cent in the next ten years, and thereafter remain steady.

The industry was little, if any, worse off than the gas industry in its ability to meet the demand and yet we did not hear of gas being cut and nothing was said about the pressure being reduced from time to time to meet the demand. There were comparatively few electricity consumers who really suffered from load shedding.

Mr. R. Birt (N.R.E.I.C.) said the paper might give the impression that power factor was no longer a problem, but there were many new loads coming on, such as fluorescent lighting, of which he believed he was correct in saying that the inherent power factor was 0.3. Improvement of power factor was best done on the consumer's premises.

Mr. R. H. Rawll (N.R.E.I.C.) said that the consumer was the reason for the industry's existence and the problem seemed to be how soon could "Mrs. Brown" expect to be supplied with electricity at a price she could reasonably afford. That should be remembered in all the technological, commercial and financial considerations. In the old days the engineer and manager regarded it as a reflection

upon himself if his undertaking did not come up to scratch, but things were a little different under nationalization. It had been suggested by Sir Henry Self that there should be competition between the different Areas by the dissemination of statistics, but he personally did not think that would carry them very far. Every individual in the industry must realize that he had his responsibility for its efficiency.

Col. B. H. Leeson (B.E.A.M.A.) said that it had been suggested that manufacturing capacity in this country was not sufficient to meet the requirements of the electricity supply industry. There was then the question of whether exports had prevented sufficient plant going into the industry, and, finally, perhaps the most important of all, there was the question of capital policy.

As regards the ability of manufacturers to meet the requirements, taking the generating side he emphasized what was said in the presidential address that the capital to produce this plant had already been invested by the manufacturers, as a matter of policy, five years ago, on the assumption that the programmes then contemplated would be carried out, and the manufacturing industry was capable of supplying all that was required. He did not want anyone to think that there was a special allocation of plant for export as such. The manufacturers had first to send out their representatives to the export markets and persuade the buyers there that the goods were as good as, or better than, and as cheap, as could be bought elsewhere. That export trade had been a godsend because without it the capital charges, from the economic point of view, would all have had to be debited to the limited home market.

Concern Over Uncertainty

With regard to generators it would be difficult for the manufacturers to dispose of their output if it could not be said on behalf of the B.E.A., quickly, what the demands would be during the next few years. It would be necessary to make greater efforts in the export markets if there was not to be unemployment in that connection and the position in overseas markets would not be so easy as it had been. The uncertainty of the position here during the next few years, brought about by capital cuts, was a matter of considerable concern to the manufacturers and he urged the supply industry to resist them to the fullest possible extent.

Mr. E. C. Lennox (North Eastern Electricity Board) drew attention to the fact that in connection with new housing schemes, which were costing £1,300 per house to erect, the electrical industry for distribution alone was spending £50 per house. There was also the proportion of the high cost of modern generating plant to be taken into account and other matters, and in those cases in which district heating was spoken of, it might well be that the industry would be spending as much as £200 per house. One of the reasons why electric cookers, wash boilers, etc., were not going in as fast as was desired was the high cost, and the electricity supply industry was losing a great deal of business. He suggested that the housing authorities should be charged with some of the £50 per house for distribution and that the industry should use it to install cookers, etc., and so make this class of property a paying proposition.

Cost of Land

Mr. A. B. Mackay (S.W. Scotland Consultative Council) spoke of the manner in which the development of the electricity supply industry was enhancing the value of land and was itself being penalized by having to pay high prices for land required for its buildings, and also increased taxation. The question of giving electricity undertakings relief from this should be taken into consideration.

Mr. W. A. H. Parker (N.R.E.I.C.) urged the industry to fight for its capital and to put its case in an objective manner so that the country could understand the position. The country dweller would not be content to see money spent on improving the services to the town dweller whilst he was denied supplies.

Mr. H. F. Dubuis (B.E.A.) referred to provision for depreciation and capital payments out of revenue, a good business practice which had been adopted in the electricity supply industry before nationalization. In providing revenue for future capital expenditure the consumer would be charged more than cost; should that be so in a nationalized industry?

Author's Reply

Sir Henry Self, in his reply, said that something might be done by way of seeking relief from profits tax and income tax. With regard to the production of plant, he pointed out that there had been cases of individual firms which were behind the programme, even in the case of turbo-alternators, although generally speaking the manufacturers had made efforts which were greatly appreciated. He promised that the Central Authority would take up the question of capital expenditure allocation in the strongest possible manner. The Authority was fully conscious of the need to keep down the prices to the consumer, but many increases in costs were forced upon the industry by factors outside its control.

Lamps and Lighting

Views on Mr. Davies's Paper

PRESENTATION of his paper by Mr. Davies was by means of a most attractive and ingenious series of demonstrations. The subsequent discussion was begun by Mr. R. A. S. Thwaites (E.D.A.), who said the author's experiments had left him rather breathless. Recalling the work of Swan in this country and Edison in America, he said that every effort should be made to ensure that the younger engineers and public were made aware of the great things which the pioneers had done in this small island of ours.

The introduction of the tantalum lamp caused the supply industry to worry at first that it might lose perhaps half its revenue, but that did not happen because with lighting of greater efficiency the public did not reduce its consumption of electricity, but rather increased it. Modern lamps were eight times more efficient than the earlier ones, and when one took into account the improvement in the efficiency of generation, they were now getting about 80 times as much light from 1 lb of coal burned in the power stations as they did under the original conditions. There was a vast field for street lighting. Although the author had said that the experimental fluorescent lamps were available only for non-fiery mines, it was to be hoped that further developments would render this type of lighting perfectly safe also for fiery mines. The author's demonstrations should be repeated in the Area Boards' showrooms to show the public the great possibilities.

Mr. R. Birt (N.R.E.I.C.) regretted that the author had not referred in the paper to the power factor of fluorescent lighting nor to the 8ft 120 W lamp, although an example of the latter was exhibited. What progress had been made towards improving the power factor of the fluorescent lamp? It was a matter of great interest to the supply authorities. The 8ft 120 W lamp, with the circuit which was being designed by the manufacturers, should have a leading power factor and that would partly counteract the lagging p.f. of motive power.

British Pioneer Work

Mr. W. J. Jones (E.L.M.A.) said he had been told that there were more fluorescent units of British design in use in other countries than in England. The time was rapidly approaching when the restrictions of the Ministry of Transport on street lighting should be entirely lifted so that a more intensive interest could be taken in fluorescent lighting. There were 90 or 100 small installations of this kind in this country, some consisting of a few lamps and others of 100 or more, but it was essential that we should go much farther than that if we were to maintain our pioneering tradition. In connection with coloured fluorescent lighting he suggested that the Festival of Britain would offer a fine opportunity to show what could be done. As to the public inclination to regard electric light as somewhat expensive, he suggested that those concerned with service should deal with this in a way which the public could readily understand. Utilization and promotional effort should form the subject of a paper at these Conventions.

Mr. L. J. Davies with one of his "exhibits"

Mr. G. F. Moore (S.E. Scotland Electricity Board) asked if there was any prospect of the colour rendering of the sodium lamp being improved. Owing to the high efficiency of this lamp it was being adopted by large numbers of street lighting authorities. If it was impossible to improve the colour rendering, makers should devise lamps for use with the same fittings.

The author, replying, said the basic power factor of the fluorescent lamp itself was about 0.9, but when the inductance in the circuit was added it fell to about 0.5. He did not know what progress could be made there except to make use of lagging as well as leading circuits, as Mr. Birt had implied. The 8ft 120 W lamp had a power factor of 0.75 with a condenser and inductance in series. He had thought that 98 per cent of the lamps had power factor correcting condensers permanently connected. The reply to Mr. Moore on sodium colour correction was definitely "No."

Lord Citrine moved a vote of thanks to the author.

Boilers and Turbo-Generators

Discussion on Papers by
Messrs. J. D. Peattie, W. F. Simonson and G. T. Moore

THE first speaker in this discussion was Mr. J. N. Waite (London Division, B.E.A.), who said that Mr. Peattie's paper gave a large amount of information that had not generally been available before. It was an excellent record of the improvements made in the operation of B.E.A. stations notwithstanding the acute shortage of plant.

It was not generally appreciated that an improvement in station load factor reduced the average thermal efficiency; most people would think the opposite to be the case. The reason was that when the system load factor was increased the extra units had to come from the least efficient plant because the most efficient was already fully loaded. They would shortly be putting a very considerable quantity of high efficiency plant into operation and the first of that plant would be very highly loaded, so that the effect on the average thermal efficiency and coal cost would be very marked in the early days. The law of diminishing returns would then start to operate and in a few years the thermal efficiency curve and the coal cost would be very materially improved. He did not know that the B.E.A. could take all the credit for that because the C.E.B. had had a little to do with it.

Influence of Capital Charges

Against this, of course, would be the increased capital charges due to the high cost of the new plant, and while those on the operating side were anxious to show an overall reduction it was a little doubtful whether that would be possible. They were looking forward to standardization of plant to bring about a reduced capital cost and simplified layout.

To-day 64 per cent of the total cost of electricity was on the generation side. In the old days it was of the order of 30 to 40 per cent with the remainder on the distribution side. This increase was almost wholly due to increased coal cost as the new capital charges had not yet started to operate. The increase in efficiency had been almost completely swallowed up by the increased cost of coal. Gas washing added an extra 10s or 12s to the cost of coal; more trouble was caused by gas washing than was saved.

It would be increasingly necessary to start turbines and to load them fairly quickly. That would facilitate enormously the operation of stations with a night load of the order of 30 per cent of the day load, and the base load and most efficient plant to-day would not necessarily be so 10 or 15 years hence.

Mr. J. W. H. Dore (B.E.A.) said that Mr. Peattie might have laid much greater stress on the need for greater uniformity of coal quality because it affected capital costs, efficiency in operation and availability. He did not agree with Mr. Simonson's rigid association of the electrostatic precipitator with pulverized fuel firing. The time would come when it would be necessary to re-examine the performance of the precipitator in relation to the characteristics of flue dust, while better methods of testing grit extraction and interpreting the results would present a picture which might be very different from pre-conceived notions. It was wise to keep an open mind on this matter as well as about slag tap and cyclone furnaces, otherwise one might be lured into assuming that one thing was naturally associated with another. Consistency of fuel characteristics was also important in this connection. One should await full-scale experiments before becoming over-enthusiastic.

No one would quarrel about the technical achievement of the boiler makers, but they should keep cost a little more in the forefront. Regarding turbo-generator standardization, things were not yet in a sufficiently stable position to be sorted out. Technical interest was one thing, but what was of even more importance was frank discussion of the cost of changing from this to that. It was not at present at all easy to get a clear idea from the manufacturers of what was likely to be the trend of cost in a particular direction.

Plant Standardization

Mr. F. L. Donnison (B.E.A.) said that a census of the plant authorized for construction in the respective countries for any post-war year would show that the British had far outstripped any country in regard to the the percentage of standardized plant. While standardization had certainly assisted in speeding up the commissioning of new plant there was little evidence that prices had been materially influenced in favour of the user. Yet surely the primary aim of standardization was to improve productivity and thereby reduce manufacturing costs.

When putting forward proposals for plant for advanced class stations, manufacturers of component plant were naturally inclined

to be influenced by the relative optimum component plant efficiencies envisaged. Until these were more closely assessed it should not be taken for granted that the bigger advanced class units at present envisaged would bring the best overall commercial return to the purchaser. The efficiency of the B.E.A. system was in a large measure affected by the rate of load change which could safely be achieved on the medium-class peak load machines, which, in turn, affected the plant load curve of the more efficient base load machines. There might, therefore, be a case for fitting all future 30,000 kW and over machines with turbine supervisory gear to obtain the safe maximum permissible system rate of load change.

The speaker pleaded for more strenuous care to ensure that steam and oil passageways were as free from scale and dirt as possible before the machine was commissioned. The importance of improving jointing technique was emphasized as even on newly commissioned machines difficulty had been experienced in keeping the casings steamtight for any length of time. From limited tests of turbine governor anticipatory gear, he felt that the interests of larger machines would be better served by improving the main governor characteristics to meet the requirements of B.S. 132, rather than by the adoption of subsidiary equipment.

Steam Control

Vacuum unloading gear should not be capable of completely shutting off steam while the set was connected to the system and running at 3,000 r.p.m. Automatic reloading of the machine was considered undesirable, so the gear should be arranged to be reset by hand. Vacuum trip gear was merely a further protection against the failure of the unloading gear. At some point in excess of 1,000 lb/sq in initial steam pressure it should be economical to introduce dual feed pumping, but the relative overall efficiencies and prices quoted for the feed-heating systems precluded any support for the dual pumping arrangement. In this respect commercial considerations might be distorting the engineering facts and impeding progress.

The multi-effect central evaporating plant offered advantages for medium-class peak load stations over the unit type bled steam evaporator, but for base load plant operating with high initial steam conditions the reverse was the case.

Mr. W. S. Burge (East Midlands Division) said he would like to modify the term "complete unit" system and call it the "separate unit" system of layout. When power stations were isolated it was essential that the separate units internally should be interconnected through the auxiliaries. Later on came the grid with external interconnection and he did not think it had been appreciated what a fundamental change that had made. It was better to deliberately risk the loss of a 100 MW unit in one power station than to have the chance of a sympathetic shutdown between that set and others in adjacent power stations, which, in turn, could easily result in the loss of two, three or four power station outputs. Also, considerable capital expenditure could be saved by steaming the largest generating units through one boiler. Further appreciable savings of capital could be made by simplifying the civil engineering work and by having one boiler for each set.

Assessing Thermal Efficiency

To say that a power station had an overall efficiency of 23.8 per cent was of value from an accountancy point of view, but the station staff had to go much farther in order to get any intelligent idea of what was happening. Now that the nationalized industry had the power to introduce a fresh method he suggested that a new national standard of expressing thermal efficiency should be in three terms of the steam cycle efficiency, the coincident plant item efficiency and the operation factor.

Mr. J. W. Mayer hoped that at subsequent Conventions there would be very much more in the way of operational papers because they would be of great assistance to design. Pulverized fired boiler performance was easily obtained and readily maintained almost for an indefinite period, but what was of equal importance to the operator was that it was suitable for a wide range of load. As the proportion of pulverized fuel plant in operation increased overall station performance might be improved. There had been an increase in power consumption by auxiliaries over the years, but the most efficient type of auxiliary drive would pay for itself.

If boiler breakdowns were somewhat numerous, they were definitely not very destructive, although everybody would like to see less of them. Boiler house buildings should be much more functional in design. There should be a shell of sheeting material and 60 per cent of it should be movable so that the sides could be opened when necessary.

While during the past 15 years all the coal he had had to design for was uniformly poor, there had been no difficulty in coping with it. The drawback was that with lower calorific value the price had increased. Power stations should use more open-cast coal. There were some 13 mil-

lion tons available, but according to Mr. Peattie's paper, power stations were only using something like 4 million tons. The drawback to it was its size, but this could easily be remedied by pulverization. It had not a high ash content or high moisture content and it had very good fusion qualities.

Mr. L. W. James said that the proposed preferred standards left the generator voltage for 100 MW machines to the makers' choice. This might be a reasonable arrangement at present, but when the makers had had experience with large hydrogen-cooled machines it would be an advantage in so far as spare transformer capacity was concerned to standardize some voltage acceptable to all manufacturers.

Hydrogen-cooled machines could be built in America for about the same cost as an air-cooled machine of the same rating, but in this country there was a very substantial increase in price.

Coal Board's Views

Mr. B. L. Metcalf (chief engineer, National Coal Board) said that the N.C.B. was very "quality conscious": indeed, it was not allowed to forget it! But he suggested that the policy of the B.E.A. was too perfectionist without any real attempt to understand the problems of the mining industry. There were very few seams which were alike, the quality of technical management (both past and present) varied from pit to pit, and the skill (or willingness) of the miner to fill clean coal was another variable. Then there was the capital involved in preparing the coal for the market, expenditure which must be balanced and weighed against all the other demands for capital within the economic straight-jacket to which Sir Henry Self had referred in his paper. Therefore, he suggested that some future Conference should be devoted to a real effort to explore the problems of the two industries, with papers by the Coal Board as well as by the B.E.A. This might start with a series of regional conferences between the marketing and coal preparation people on the one side and the generating engineers on the other, the results to be boiled down to a more concise form for consideration at a national conference. His second suggestion was that as part of their training generating engineers should be given the chance to work in a coal preparation plant and thus to understand the problems to be dealt with. This exchange might, with advantage, be a two-way process. Finally he suggested the building of small power stations, up to 20,000 kW, at the pithead to make use of the low-grade coal, some of which was worse than Mr. Peattie had experienced.

Mr. J. W. Thomas, referring to the B.E.A. courses for boiler house staffs, emphasized their importance and gave a few details of what the B.E.A. was doing in this respect.

Dr. H. J. Bock remarked that fuel quality was, to a certain extent, characterized by the ash content, but that was not everything. Nothing had been said in the papers about grindability, fusion point, etc., although those factors were very important. Efficient boiler plant had to be paid for and as a means of reducing capital cost he suggested the possibility of reducing the efficiency by half or one per cent by a reduction of the heating surface, so making it easier for the boiler maker to cope with availability.

The B.E.A. should issue reports on its troubles and the remedies it had applied which could be compared with remedies which the makers had applied for similar difficulties. Insufficient attention was paid to the quality of the water. He supported Mr. Metcalf's suggestion that power stations should be erected at the pithead.

Mr. J. L. Ashworth (North Western Division) said that supervisory control for high-pressure turbines should be more widely publicized. Complete supervisory control was fitted in very few power stations in this country at the present time, but the new 60 MW machines going in were to be so fitted. The outage of a 60,000 kW machine in his Division would cost £650 to £850 per day extra in fuel for running low-efficiency plant to compensate for the loss of the big set.

Mr. H. Midgley (South Western Division) said that he did not wish to be accused of being reactionary, but it should be considered carefully whether power stations were not getting a little too complicated. He wondered whether some of the design and manufacturing effort involved in this complication could not be more profitably devoted to increasing generating capacity.

Simplified Boiler Houses

Capt. J. M. Donaldson recalled the case of a station a little more than 10 miles from London which used to get coal at 10s or 11s a ton. That might have been an immoral price—it probably was—but he was not at all certain that the present price of coal was not equally immoral in the other direction, particularly as power station engineers had to take what they were given, whether they liked it or not. As regarded civil engineering construction, present designs were too expensive, especially in the case of the boiler house, and he had been impressed by the statement of Sir Henry Self that the time might come when the boiler house buildings would have to be omitted altogether to save capital cost.

Annual General Meeting

Election of New President

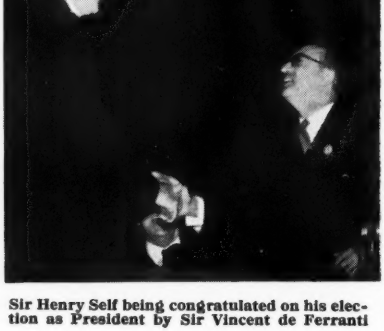
SIR VINCENT de FERRANTI opened the second annual general meeting of the Convention on Friday morning last and presented (as read) the minutes of the last meeting at Torquay and the Council's report for 1948-49.

Dame Caroline Haslett moved the adoption of the Council's report and accounts for 1949-50. She said that the accounts showed what could be done when manufacturers, contractors and voluntary organizations co-operated with a nationalized undertaking. Mr. R. Birt seconded the motion, which was adopted.

After some debate upon the method of nomination and election a resolution was passed providing for the creation of the office of vice-president. It was decided to alter No. 6 of the Convention rules to enable the two immediate past-presidents to remain members of the Council.

Nominations to the Council were received. The names remain as before except that Mr. H. Astbury succeeds Mr. R. Lee as representative of the E.R.A., Mr. E. R. Wilkinson succeeds Mr. R. A. S. Thwaites as E.D.A. representative, and Lord Citrine and Col. W. M. Lapper succeed Sir Henry Self and Mr. J. Eccles.

When it came to the election of a new President Sir Vincent de Ferranti said that he looked forward with pleasure to handing over the office. The Council was putting forward Sir Henry Self for election. Sir Henry was a well-known public figure with a very wide range of interests. But with all his attainments he was a very human person and his name was put forward by the Council with every confidence. Mr. H. V. Pugh seconded Sir Henry's election, which was unanimously accepted.



Sir Henry Self being congratulated on his election as President by Sir Vincent de Ferranti

In acknowledging his election, Sir Henry Self said that Sir Vincent de Ferranti had had only one president to follow; he had two admirable patterns which set a "tough" pace, but he would do his best. He was young in the industry but he had at least obtained a thorough insight into the wonderful spirit throughout the whole of the industry in spite of inevitable differences of opinion. It should be the supreme effort of the Convention to foster this spirit for the good of the body corporate and for the future which lay ahead.

Sir Vincent de Ferranti said that the Council recommended the acceptance of an invitation from the Corporation of Brighton to hold next year's Convention there. Mr. H. F. Carpenter moved the acceptance of the invitation, which was agreed.

Sir Vincent then expressed thanks to those who had contributed to the success of the Convention, mentioning particularly the Mayor and Corporation of Harrogate and their officials and Mr. G. G. L. Preece who had again organized the golf competition in aid of the E.I.B.A.

In moving a vote of thanks to the President, Sir John Dalton said that the Convention had been a success through the efforts of a great man who had been ably backed by a very charming wife. Replying, Sir Vincent said that he was very proud to have been chosen as President and greatly appreciated the great honour which the industry had conferred on him.

E.A.W. Luncheon

THE President of the Convention was the principal guest at the luncheon arranged on 22nd June at the Lounge Hall, Harrogate, by the Electrical Association for Women. The President of the E.A.W., the Dowager Lady Swaythling, took the chair. The toast of "The E.A.W. Silver Jubilee Year" was proposed by Sir Vincent de Ferranti, who said that the Association had done a very great deal towards bringing about the change in the outlook of women towards electricity in the home. Much attention had been given to electrical devices for industry; it was time equipment for the home received more attention. He made a graceful reference to Lady Swaythling and said that Dame Caroline Haslett had started the E.A.W. with great enthusiasm and had succeeded in getting good people, like Miss Vera Norvick, to help her. The electrical industry, said Sir Vincent, fully recognized what the E.A.W.

had done and they had no doubt that it would carry on its good work.

Mrs. G. A. Tatchell, J.P. (hon. treasurer, E.A.W.), responded to the toast saying that the Ferranti family had always been kind, generous and helpful to the Association since the late Dr. S. Z. and Mrs. de Ferranti had given their active support and practical assistance. Lady de Ferranti had been president of the Manchester Branch. The E.A.W. was now officially represented at the Convention. She assured Sir Vincent de Ferranti that women were fully alive to the importance of making their electrical needs known.

The health of the guests was proposed by Councillor Mrs. Fisher, J.P. (immediate past-Mayor of Harrogate). She referred to the presence of the Mayor and Mayoress, of Harrogate, Lord Citrine, Sir John Hacking and Sir Henry Self, chairmen of Electricity Boards, representatives of manufacturers and contractors, and Dr. Laura Veale, president of the Harrogate Branch of the E.A.W.

In replying for the guests, Mr. H. H. Mullens, chairman of the North Eastern Electricity Board, mentioned that the jubilee celebrations of the E.A.W. had achieved recognition in a B.B.C. programme. The Association had received better publicity than the B.E.A. from the B.B.C. He reminded the company that Miss Norah Balls, an active worker for the E.A.W., was a member of his Board.

Lady Swaythling concluded the proceedings with one or two of her anecdotes which are always a feature of this annual event.

Convention Report Corrections.—We regret that by a confusion of names Mr. G. C. Burnand was described as Mr. C. V. Burnett in photograph No. 11 reproduced on page 1213 of last week's issue.

In our exhibition notes (16th June) referring to the display of "Diamond H" Switches, Ltd., we mentioned a 7in neon pilot indicator; this should have read "74A1." The toggle switch illustrated is single-pole, not triple-pole.

Brazil's Five-year Plan

From a Correspondent

THE "Salte" Plan, as amended by Congress, was sanctioned by President Dutra, of Brazil, on 18th May. Its objects are to raise the standard of national health, increase agricultural production, improve transportation and develop supplies of electricity and fuel.

The entire programme entails an expenditure of £427.5 million, to be spread over the years 1950-54. Of this large sum £271.7 million will be secured by ordinary budgetary allotments and by grants made obligatory by the 1946 Constitution; £133 million will be supplied by credit operations, including advances by the Bank of Brazil and an issue of Treasury bonds, bearing 7 per cent interest. The remainder will be derived from normal government resources.

A sum of £145.2 million is set aside for improving railway communications, £24 million for road building, £17.8 million for building, enlarging and deepening ports, £10.8 million for the purchase of ships and £17.8 million for improvements to airports. The first item includes laying of new tracks, linking up disconnected units, standardizing systems, modernizing signalling equipment, substituting diesel for steam traction and electrification of busy sections; £7.5 million is earmarked for improvements to the ex-British Leopoldina, Great Western and San Paulo Railways.

The road-building programme will call for large purchases abroad, and a great deal of electrical equipment will be needed for 25 ports which are to be built or enlarged. As regards airports, the principal imports will be in respect of wireless stations, modern signalling and flight control systems, and equipment for aerial photographic services. A sum of £7.9 million is allotted to these items.

Another section of the plan provides for an expenditure of £31.4 million for increasing supplies of electrical energy. Part of the work consists in raising the capacity of existing power stations and extending transmission systems in rural districts. Those in the mining centre of Minas Geraes will be reinforced to meet the growing demands of local iron and steel works and permit the electrification of two railways carrying ore. New thermo- and hydro-electric stations will be built in the States of Matto Grosso, Goias, Ceara and Piaui, and the existing stations in Maranham, Para and Manaus will be re-equipped. Assistance will be given to six other States to build and enlarge stations.

The same section of the Plan provides for accelerating the development of Brazil's oil industry at a cost of £28.4 million. This sum includes the purchase of equipment for prospecting, drilling, refining and storage.

VIEWS on the NEWS

By REFLECTOR

THE large number of people attending the British Electrical Power Convention considerably limits the number of places which can be chosen for the event and several more desirable towns are ruled out. At Harrogate there seemed to be a general impression that somewhere by the sea is preferable to an inland town. This requirement will be met next year when the Convention will visit Brighton. The announcement made at the general meeting of delegates disposed of the rumours and speculative booking of accommodation which have characterized previous Conventions.

★ ★ ★

In his contribution to the discussion on Mr. L. J. Davies's Convention paper, Mr. W. J. Jones (E.L.M.A.) reminded the meeting that it was cheaper to run a 60 W lamp for ten minutes than to burn a match. I believe this to be generally true, even if the cost of the lamp, as well as the energy, is taken into account. Mr. Jones went further into cost comparisons when he said that the payment for a "perm" would cover the whole cost of lighting a house for (presumably) a year. The implication that a housewife should balance accounts by cutting out one "perm" a year met with an amused response from the audience—particularly the feminine element.

★ ★ ★

The laying of an 11 kV cable under the railway at Gatwick is the subject of an interesting note in *Seaboard*, the South Eastern Electricity Board's magazine. The cable is required to supply the Crawley New Town sewage works, a brickworks and a grass-drying plant. It was not possible to excavate a trench as the electric railway is in use all night and the current cannot be switched off. The expedient was therefore adopted of using a thrust bore. To carry the cable under the seven-track railway a bore of 120ft was necessary. By placing the machine in an 8ft pit this longer-than-usual thrust was successfully accomplished at the second attempt. An 8in enlarging head was fitted to the rod and 4in fibre ducts drawn back as darkness and a great deal of rain were falling. The work was completed in four hours. Incidentally, I gather from an American journal that the Toledo Edison Co. is using a sectional auger with 5 h.p. air motor for such work.

★ ★ ★

A reader well known in connection with wood-pole construction has sent an extract from a Sunday newspaper which refers to an exhibit at the Bell System museum in the United States. It is a 1ft section of a telephone pole in which woodpeckers are said to have stored more than 200 acorns. He says that there have been a number of cases of woodpeckers making holes in power poles in this country, but he had always thought these were made in search of insects. This acorn business is an astute move on the part of the Californian relative of our own species. It does not eat the acorns; each contains a maggot, and the acorn is fitted into the hole cup end first so that the "meal" cannot escape. This is done before the bird migrates for the winter, and on its return, at an off-season, it finds the contents of the nobbly pole very sustaining.

★ ★ ★

The lot of the Yorkshire Electricity Board and its staff is cast in a pleasant place. Many of the Harrogate Convention delegates visited Scarcroft, near Leeds, as guests of the Board's chairman, Col. W. M. Lapper. People from the crowded cities and towns envied those who are fortunate enough to work there. Mr. F. Newey, the deputy chairman, showed me round the place and displayed a just pride in it. The Board has added to the Lodge, which was purchased by the Yorkshire Electric Power Co. in 1945, and has converted a number of outbuildings to its use. The result is a rare combination of beauty and utility.

Industry and the House

Finance Bill in Committee

By F. J. ERROLL, M.A., A.M.I.E.E., M.P.

THE Committee Stage of the Finance Bill lasted five days and two nights. Although it was considered to contain little of a controversial nature, apart from the petrol tax, a large number of Members, including many of the new Conservative M.P.s, wished to take part in the discussion on every clause and new amendment.

The debate on the whole of the first day and for most of the night as well was taken up with the increase in the duty on light hydrocarbon oil. The increased tax on petrol, the most important part of this duty, was stoutly condemned by Mr. Lyttelton who moved an amendment to abolish the increase. He said that this country was one of the most highly taxed in the Commonwealth in the matter of petrol. Any increase was intolerable considering that the general level of taxation was the highest in the world, 43.7 per cent of the national income. The tax would increase the costs of production and distribution and many of the increased costs could not be borne by industry. The British Transport Commission alone would have to pay £6 million more and London Transport £1,250,000.

Petrol Tax Defended

Mr. Gaitskell, the new Minister of State for Economic Affairs at the Treasury, sought to defend the tax by saying that its purpose was to provide the money for reductions in the rate of income tax at the lower levels. He did not think that private motorists were seriously worried about the tax, and the effect on the operating costs of commercial vehicles would only be small. In the end the Government carried the day by a majority of 13.

Shortly after midnight the Opposition proposed a series of amendments designed to exempt light oils used for industrial purposes, civil aviation, and for agriculture from the higher duty. It was asserted that the doubling of the duty would increase costs in industry, aviation and agriculture and was to be deplored at a time when the Government was urging upon industry the importance of lowering costs.

Mr. Jay, Financial Secretary to the Treasury, maintained that the increases were "infinitesimal" and that a tax remission for industrial users would involve a heavy burden of administrative work upon the Customs and Excise.

Levy on Commercial Vehicles

On the next day the Opposition attacked the Government's intention to levy purchase tax on commercial road vehicles. Mr. Peter Thorneycroft pointed out that supporters of the Government had made savage attacks on "C" licence holders, almost as though a man had no right to drive his own goods about the country in his own vehicle. Sir Arnold Gridley begged the Government to help in reducing industrial costs. He said he was tired of being asked to reduce costs and compete with increasing overseas competition, when at the same time power, gas and transport were costing more.

In his reply Mr. Jay announced a welcome concession: the tax would be levied on the chassis of goods vehicles and not on the vehicles complete. This concession would cost the Treasury about £3 million a year but it would simplify collection and also provide considerable relief for electric battery vehicles since the batteries would not count as part of the chassis. Pedestrian-controlled power-operated vehicles would be exempt from the tax.

Discussion on purchase tax, always a fertile field for debate, was as lively as it could be this year under the restrictive Budget Resolution which confined the subject to changes in the general rates and thus prevented detailed argument about the incidence of the tax on

individual articles. Thus the unfair treatment of electric heating appliances was barely mentioned at all, and the high rate of tax on these articles must remain.

On the final day a debate on reserved profits in industry, a number of new clauses, all of which were rejected by the Government, and some changes to the purchase tax on vehicles brought the Committee Stage of the Finance Bill to an end at 5.15 a.m. the following day.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons on 20th June, Mr. John Grimston raised the question of the bulk buying of copper. He said that this imposed a burden of about £1,500,000 on our exported products.

Mr. Charles Orr-Ewing spoke of a case in which 1,000 tons of copper was offered to a cable firm at £100 per ton. Of course that could not be accepted on the present bulk-buying scheme. It had to be bought at the prices laid down by the Ministry of Supply, which had varied from £107 a ton to about £140 after devaluation. The current price was £118. We were being undersold in this trade by the Germans by no less than 30 per cent. He hoped the Minister would consider reintroducing a commodity market in copper again into this country.

Mr. John Freeman, Parliamentary Secretary to the Ministry of Supply, said that the Government was not doctrinally wedded to the bulk purchase of basic metals. The salient advantage now, he would say, was specifically the dollar saving. The disadvantage was the probability—not a certainty—that, as supply and demand balanced and the market began to fall, the Government would face heavy accounting losses. He did not see how they could free the market either until our dollar balance was a great deal more secure than it was now, or until we were able to satisfy a much higher proportion of our needs of electrolytic copper from Northern Rhodesia. But if they could get over the difficulty of losing sterling metal they would at least undertake to look with sympathy on any alternative to bulk buying.

Profits Tax on Reserves

During the final stages of the discussion in Committee of the House of Commons on the Finance Bill, Mr. Eden moved a new clause to exempt from tax companies' profits put to reserve.

Sir Arnold Gridley, supporting the clause, said people in charge of businesses were constantly trying to solve the problem of increasing production and overseas sales, and lowering the costs to do so. One very grave handicap was the shortage of electrical power, a matter which was referred to by Sir Henry Self, speaking at Harrogate. He had pointed out that the whole of the capital investment programme of the Government might be thrown in complete jeopardy after a number of interruptions in the supply, reducing for several hours in the winter months the rate of production, which was running in this country at present at some £6,000 million per annum.

If those who were responsible for what they did with their profits decided to limit dividends, at the Chancellor's request, and leave as much as they could in reserve, a great deal of what was left was taken in taxation by the Chancellor with the other hand. They had not the wherewithal to provide the additional new equipment needed to reduce costs and improve production. Had we reached a peak of production and were we now faced with a decline? He knew that great anxiety was felt in the shipbuilding industry, and unemployment was commencing there. Did Members realize what was the effect of the rise in prices on the cost of production in the electrical industry alone? Only a few days ago the price of copper went up £16 a ton, and it might go up still further.

Mr. Gaitskell, Minister of State for Economic Affairs, said he seldom came across any suggestion that one of the factors preventing productivity was lack of finance.

Mr. Lyttelton said that there was a shortage of electrical power in this country because there was a shortage of capital. Power could be greatly increased if that were not so.

Mr. Gaitskell asked whether it was really suggested that the B.E.A. could not build power stations and install equipment today because it was short of finance?

Mr. Lyttelton said that the B.E.A. could not get on with its job now because there were insufficient savings, in the view of the Government, to reinvest over the whole programme; and it had been forbidden to carry out the programme which it thought was necessary.

Mr. Gaitskell said it was useless to pretend that individual companies were short of finance with which to purchase equipment. There was a long queue of people wishing to proceed with investment. There was ample finance, but the physical resources were not so easy. That was quite natural in a time of full employment, when we were trying to build our export trade, to restore our trade balance and to recover from the war.

The new clause was rejected by 295 votes to 284.

Tax on Electric Vehicles

Sir Wavell Wakefield moved an amendment to remove from the operation of the purchase tax "battery electric vehicles designed and permanently fitted solely or mainly for the carriage of goods." He said that obviously the reason for the purchase tax on goods and commercial vehicles was to save petrol and its dollar content, but the same arguments could not be used about battery-electric vehicles. The argument for diverting the carriage of goods from the road to the rail by limiting commercial vehicles on the road and putting purchase tax on them could not be used in the case of these electric vehicles, because their radius of operation was very limited, and they were supplementary and complementary to railway transport. Another reason for putting the tax on commercial vehicles was to divert more such vehicles to the export trade by keeping them off the home market. There was no export trade in this type of vehicle. There was a positive advantage in giving encouragement to the production and operation of battery-electric vehicles because the British Electricity Authority wanted to even out its load; the batteries of the vehicles were charged at night-time when the load was at its lowest.

Mr. Jay, Financial Secretary to the Treasury, said that the Chancellor considered these vehicles very carefully in consultation with the trade. Indeed, it was that, among other things, which led the Treasury to decide to transfer the tax to the chassis, which was a considerable relief for electric vehicles, but he did not think a case had been made out for exempting them altogether. There were some small exports of these electric types and they could be further increased. But the deciding factor was that electric vehicles were obviously in competition with the ordinary petrol goods vehicle, and it would not be in accordance with the principles of the purchase tax to exempt them. It would not be practical to put this heavy tax on one type and exempt altogether another type which was in direct competition with it. By transferring the tax to the chassis, the Treasury had gone a long way to meet the arguments of the manufacturers of these vehicles.

The amendment was negatived.

Midland Board's Headquarters

Mr. Nabarro asked the Minister of Fuel and Power whether he would state the sum licensed by his department for the extension of the headquarters of the Midlands Electricity Board at Mucklow Hill, Halesowen, and the quantities of steel, timber, bricks and cement that would be required for that extension.

Mr. Noel-Baker said that a licence for work costing £59,000 was issued by his predecessor. The British Electricity Authority estimated that when the work was completed it would have required 139 tons of steel, 5.1 standards of timber, 410,000 bricks and 245 tons of cement.

Iron and Steel Prices

Mr. Nabarro asked the Minister of Supply why price control regulations remained necessary for steel, rolled and re-rolled steel products and wire, excepting only steel sheet and tinplate.

Mr. George Strauss said iron and steel prices were controlled in conformity with the Government's policy of maintaining low and stable prices of essential commodities over as wide a field as possible.

London Railway Electrification

Mr. Nigel Davies asked the Minister of Transport whether he intended making a statement on the 1949 Working Party's Report for London Railways; whether he was prepared to accept the recommendations of the report in general; and whether he was prepared to accept the proposal for the electrification of the Chingford and Enfield Town lines from Liverpool Street station.

Mr. Barnes said that the recommendations of the report mainly related to long-term improvements which could only be carried out gradually within the framework of capital investment policy. They must all be carefully considered with the planning authorities concerned and properly related to other aspects of planning. It was, therefore, impracticable to say at this stage to what extent the proposals would be adopted and he was not in a position to make any general statement. In regard to the proposal to electrify the Chingford and Enfield Town lines, he was in consultation with the British Transport Commission and hoped to discuss the matter in due course with the representatives of the areas concerned.

PERSONAL and SOCIAL

News of Men and Women of the Industry

MARCONI'S WIRELESS TELEGRAPH CO., LTD., announces that **Mr. R. P. Raikes** has been appointed publicity manager in succession to the late Mr. W. G. Richards. Educated at the Royal Naval College, Dartmouth, Mr. Raikes joined H.M.S. *Warspite* as a midshipman, serving in that ship until 1932. From 1932 to 1934 he was a sub-lieutenant, specializing in submarines and during the war commanded the submarines L.26, *Tribune*, *Seawolf* and *Tuna*. He retired from the Navy in 1946 (through ill-health) as lieut. commander, with the D.S.O. In 1947 Mr. Raikes was appointed press and publicity officer of the British Legion in Scotland and joined the Publicity Department of Marconi's as deputy publicity manager in 1949.

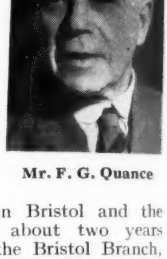
Mr. C. Stuart, A.M.I.E.E., has been appointed lighting engineer for Scotland for Ekco-Ensign Electric Ltd. He will operate from the company's Glasgow office, 26, India Street. Mr. Stuart has until recently been with the Scottish area organization of Philips Electrical, Ltd.

Mr. W. H. Hoare has retired after fifty years' service with Berry's Electric, Ltd. Mr. Hoare joined the company in May, 1900, and although he was associated with other departments he was chiefly responsible for the switchgear and switchboard section in London and the South of England, which has always been under his management. He was for many years London branch manager, and was also the company's representative in the E.W.F. and the Small Switch and Fuse Gear Section of B.E.A.M.A.

Mr. W. H. Hoare

Mr. B. R. Sankey, A.M.I.E.E., formerly acting managing director, has now been appointed managing director of the International General Electric Company of New York, Ltd., Crown House Aldwych, W.C.2. Mr. Sankey, who originally served an engineering apprenticeship with the British Thomson-Houston Co., was engaged on general engineering and construction work in South Africa before joining the International General Electric Co., Inc., in Schenectady, U.S.A., in 1925. During the last war he served in the Technical Branch of the R.A.F., attaining the rank of squadron leader.

Mr. F. G. Quance, A.M.I.E.E., manager of the Accessories Department of the General Electric Co., Ltd., is to retire at the end of this month after fifty-six years' continuous service with the company.



Mr. F. G. Quance

He joined the G.E.C. in August, 1894, as a junior in the company's Engineering Department, and in 1903 he was appointed to take a senior position in the company's Cardiff area. After representing the company in Bristol and the West of England for about two years before the opening of the Bristol Branch, he returned to Cardiff as assistant manager of the area.

Following a short period in 1913 with the Liverpool branch, he was appointed manager of the Sheffield branch, and towards the end of 1915 assistant manager to the Lancashire and Yorkshire sales areas, a position he held until his appointment in 1926 as manager of the Accessories Department at the head office of the company. Mr. Quance was a founder member of the B.E.A.M.A. Accessories Section and has served on its Standing and Technical Committees since its inception.

He is a member of several B.S.I. Committees and Sub-Committees, and has been a member of the Executive Committee of the Association of Manufacturers of Electric Wiring Accessories since its commencement. He was also for some years a member of the Executive Council of the Association of Supervising Electrical Engineers.

Mr. E. Hughes, D.Sc., Ph.D., M.I.E.E., is retiring in August from the headship of the Electrical Engineering Department of the Brighton Technical College and is being succeeded by **Mr. W. A. Turner,** B.Sc.,

A.M.I.E.E., at present senior lecturer at the Northampton Polytechnic, London, E.C.1. Dr. Hughes received his technical education at the Heriot-Watt College, Edinburgh, and served his apprenticeship with Crompton & Co., Chelmsford. After a period in the Design Office of the G.E.C., Witton, he was appointed lecturer at the Heriot-Watt College. Of his many papers on original research eight were published in the *Journal* of the I.E.E., and a premium of the Measurements Section was awarded for a paper on "A.C. Characteristics of Nickel-Iron Alloys." Dr. Hughes has just published a textbook on "Applied Electricity" and is a joint author with Dr. A. Morley of three volumes on "Engineering Science." From 1939 until 1946, he was an examiner in electrical engineering for the University of London and is at present one of the Moderators of the University in this subject.

Mr. Turner received his technical training at the College of Technology and Arts, Rugby, and as an engineering apprentice with the British Thomson-Houston Co., Ltd., Rugby, with whom (in 1937) he became engineer-designer and estimator. In 1940 he was appointed deputy head of the Service Training Department and lecturer at the Rugby College of Technology and Arts, and three years later became lecturer and senior assistant in charge of the Electrical Section of the Burnley Municipal College. He took up his present position in 1947.

Mr. L. Ashman, senior traveller in the London area for the General Electric Co., Ltd., is to retire at the end of June. Mr. Ashman joined the G.E.C. in 1901 and served in various departments before leaving the company for a period of two years in 1904. On his return he spent a year in the Fittings Department and seven years in the company's Dispatch Department before joining the London Sales Department in 1914. He saw service with the Middlesex Regiment during the 1914-18 war and returned to the company's Sales Department in 1919. He was appointed to his present position in 1938. Mr. Ashman's successor is **Mr. B. E. Crow.**

Mr. L. Ashman

Mr. W. H. Mason, at present superintendent at Watford generating station of the Eastern Division of the British Electricity Authority, has been appointed station superintendent at Rye House and will take up his new duties on 1st August.

Mr. Leslie Gamage, M.C. (General Electric Co., Ltd.), was unanimously elected president of the Royal Commercial Travellers' Schools at the annual court of governors held on 16th June.

Walsall Conduits, Ltd., announces the appointment of **Mr. F. N. Crabtree** as manager of its Nottingham and Sheffield branches, as from 1st July. This area includes Derbyshire, Nottinghamshire, North Lincolnshire and South Yorkshire. Mr. Crabtree has been transferred from the Coventry Branch where he has been branch manager for sixteen years.

Mr. F. N. Crabtree

Mr. L. J. E. Hooper, chairman and managing director of Doulton & Co., Ltd., has resigned his position as joint managing director, but will still retain his office as chairman; the board has appointed **Mr. E. B. Green** to be managing director of the company as from 1st July.

Mr. E. B. M. Grubb has now been confirmed in his appointment as sales director of London Electrical Co. (Blackfriars), Ltd., and **Mr. C. R. Dirs** has been appointed purchasing director as from 1st June.

Mr. E. Martinez, of the Jamaica Electrical Supplies Co., is visiting this country for approximately four weeks during which he will be buying a variety of electrical apparatus and materials. He is expected to arrive about 13th July and can be communicated with at E. A. Issa & Bros., 207, Great Portland Street, London, W.1.

The happy association of pre-war years between the Rotary Club of Ashford, Kent, and members of the Electrical Wholesalers' Federation was revived on 15th June, when **Mr. T. R. Hills,** treasurer and a past president of the Rotary Club, and a wholesale electrical distributor, entertained his fellow associates in the electrical world at the weekly luncheon of the club and arranged a golf match at the Ashford Golf Club. Among those present were Mr. A. B. Wildsmith, secretary and director of the E.W.F., and Mr. P. G. Wallis, president of the Electrical Contractors' Association. In the golf match, the visitors were defeated by 7-1.

At the Ekco annual athletic meeting **(Ekco Social and Sports Club)** held recently on the Ekco Sports Ground, where a full programme of club, cycling and Essex Championship events took place. In the Essex County Women's A.A.A. 220 yards championship, the first two competitors beat the previous record time of 26.3 sec. Doris Chandler of the Ekco L.A.C. took first place

for the fourth year in succession in the Essex County W.A.A.A. javelin championship with a distance of 89ft 9in. The club events were also keenly contested and the final interdivisional points score was Offices (20), Plastics (10), Radio (6). One section of the large sports field had been set aside for the children. Mr. E. K. Cole, president of the club and the company's chairman and managing director, was present and at the end of the meeting prizes were presented by Mrs. Cole.

On 17th June members of **McKechnie Brothers** Widnes Works Sports and Recreation Club entertained fifty of their colleagues from the Birmingham Works Sports Club to lunch and tea. On arrival the visitors were taken for a tour of the works. During the afternoon, cricket, bowls and darts matches were played between the Widnes and Birmingham teams and in each case the home team won.

On 24th June 540 employees of the company and friends went by coach from Birmingham, *via* Banbury, Oxford and Henley-on-Thames to Maidenhead. The party then transferred to boats and were taken up the river to Windsor.

In addition to long-service monetary illuminated long-service certificates to employees, **Dewrance & Co., Ltd.,** presented illuminated long-service certificates to employees with service in excess of twenty-five years in their works canteen on 14th June. There were 197 recipients.

OBITUARY

Mr. E. Ll. Ingram.—The death has occurred in a Parkstone nursing home of Mr. Edgar Llewellyn Ingram, M.I.E.E., a former chief engineer of the Bournemouth & Poole Electricity Supply Co., Ltd., a position he held from 1898 until his retirement in 1934. Mr. Ingram was a past-chairman of the former Hampshire Sub-Centre of the Institution of Electrical Engineers.

WILLS

Mr. R. F. Mayer, of the lamp sales department of Thorn Electrical Industries, Ltd., who died on 5th February last, left £5,220 gross (£4,706 net).

Mr. D. L. McFerran, of Bangor, Co. Down, electrical engineer and contractor, who died on 8th October last, left estate in Great Britain and Northern Ireland valued at £22,153.

Mr. E. Friedland, managing director of V. & E. Friedland, Ltd., electric transformer manufacturers, Macclesfield, who died on 27th July last, intestate, left £10,510 gross (£9,206 net).

Mr. J. A. Young, late chief electrical engineer, Burmah Oil Co., Ltd., Rangoon, who died on 6th March last, left personal estate in England and Scotland valued at £10,260.

Mr. W. H. Duncan, A.M.I.E.E., formerly chief mains and installation engineer with the Manchester Corporation Electricity Department, who died on 5th March last, left £3,338 gross (£3,295 net).

Mr. R. A. Stewart, construction engineer (transmission) of the South East Scotland Division of the British Electricity Authority, who died on 4th Jan. last left personal estate in England and Scotland valued at £17,352.

A.S.E.E. Oxford Visit

ON Saturday last the Central Regional Council of the Association of Supervising Engineers paid a visit to the Clarendon Laboratories at Oxford for the purpose of hearing a lecture on electrical apparatus as used in nuclear research. Some 120 members and their wives were present, and while the lecture was in progress the ladies were taken on a conducted tour of the colleges.

The lecture was delivered by Mr. R. W. Parsons (Clarendon Laboratories), who spoke on the production of high energy particles and described the methods of using them in the examination of nuclei. First of all he explained that a nucleus can be broken up in two ways; either by using accelerated protons like bullets to knock pieces off it or gamma particles like h.e. shells which explode on getting inside it. After referring to the development of high voltages by means of a system of condensers switched by rectifiers, Mr. Parsons described the construction of the linear accelerator and the cyclotron, which produce accelerated protons, and in conclusion the synchrotron and betatron, which accelerate electrons and direct them on to a suitable target to produce a stream of gamma particles.

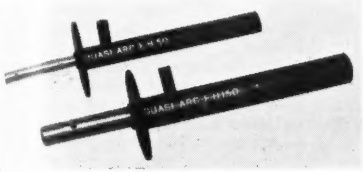
After the lecture the party made a tour of the laboratories, where equipment described was in various stages of construction. At the end of the proceedings Mr. W. F. Parker, vice-chairman of the A.S.E.E., thanked the University authorities and Mr. Parsons for making the Association's visit to Oxford such a pleasant one, and Mr. L. W. Marshall, chairman of the Central Regional Council of the Association, apologized on behalf of the president, Mr. A. G. Ramsey, and his wife who were unavoidably absent, and extended a cordial welcome to the guests.

RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PROJECTS

Welding Electrode Holders

NEW electrode holders for sheet metal welding which have been introduced by the QUASI-ARC CO., LTD., Bilston, Staffs, are of the plunger type designed to permit easy



Quasi-Arc welding electrode holders

and neat manipulation of the light-gauge electrodes used for this type of work. Two sizes are available. The smaller one (EH.50) weighs 5.250z and is designed for welding with 16 or 14 s.w.g. electrodes at currents up to 50 A. The larger type (EH.150) weighs 12.750z, and is intended for use with 16 to 10 s.w.g. electrodes at welding currents up to 150 A.

Immersion Heaters

As an alternative to their replaceable element-type immersion heaters, H. FISHER (OLDHAM), LTD., Glodwick Road, Oldham, now have a "Backer" type heater. It is available in 2 kW and 3 kW loadings, at present in 12in lengths only, but later other sizes will be made.

Whistling Kettle and Percolator

Two new "Mysto" products are announced by W. T. FRENCH & SON, LTD., Browning Street, Birmingham, 16—a 3-pint whistling kettle and a polished aluminium coffee percolator. The kettle is of copper, chromium plated, with a black "Bakelite" handle. It has a loading of 1,250 W and sells at 65s. The percolator, which has a capacity of 1½ pints, has a 350 W immersion-type element. The price is 55s.

S.E.S. Lampholders

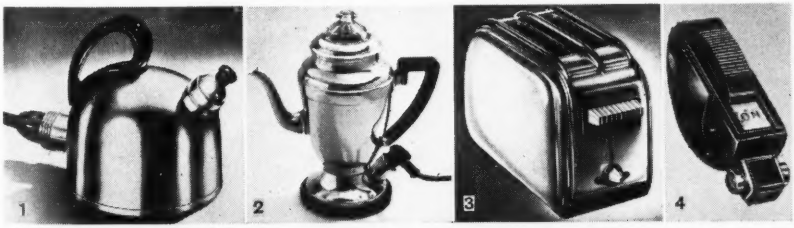
An addition to the "Treva" range of brass lampholders, made by TREVELYANS (BIRMINGHAM), LTD., 155, Bracebridge Street, Birmingham, 6, is a small Edison screw (S.E.S.) lampholder. This is of substantial construction; the case is brass and has cut threads, the interior and ring being of porcelain. It is available in cord grip, batten, ⅜in and ½in conduit patterns.

Automatic Toaster

Trouble-free service under all conditions, particularly in hot climates, is the chief aim of a new automatic toaster brought out by FALK, STADELMANN & CO., LTD., 91, Farringdon Road, London, E.C.1. Timing is clockwork controlled, an automatic temperature compensating device ensuring evenly toasted bread under all conditions. The loading is 1,250 W. The home market retail selling price is £5 18s.

Thumb Switch

A slide-action thumb switch brought out by ARCOLECTRIC (SWITCHES), LTD., Central Avenue, West Molesey, is rated at 5 A 250 V a.c. or d.c. and will withstand a flash test of more than 3,500 V between live terminals and indicator plate, and between live ter-



(1) "Mysto" three pint whistling kettle and (2) 1½ pint aluminium coffee percolator, (3) Falk, Stadelmann automatic toaster with clockwork control (4) Arcolectric slide action thumb switch

minals and tapped fixing inserts, with the switch in the "on" position.

Door Chime

It is announced that MORPHY-RICHARDS LTD., 121, Victoria Street, London, S.W.1, have introduced a new short chime (list No. B220) to replace the existing model (B120). The price will remain unaltered at 42s 6d, and while similar in appearance to the older model it has been redesigned to give a considerably louder chime. It requires a 12 V 1.75 A transformer and arrangements have been made to offer a suitable transformer (No. MR4) at a price of 16s 9d. The existing 1A transformer (MR3) will continue to be on sale.

Poultry Brooding Lamp

An infra-red poultry brooding lamp which has just been introduced by PHILIPS ELECTRICAL, LTD., Century House, Shaftesbury Avenue, London, W.C.2, provides sufficient heat for up to 100 chicks and is also suitable for the rearing of ducklings and other young poultry.

Essentially it comprises a lamp with an internal mirror so arranged that it directs infra-red rays straight down on the young birds. The heat to be supplied depends to a large extent upon the outside temperature and the degree of humidity inside the brooder house. Generally the lamps should be set at an initial distance of 16 in.

Rated at 250 W, these lamps are available for mains voltages between 100 and 250 V and can be used with ordinary porcelain lampholders, the normal life being about 5,000 hours.

Imitation Fuel Effect Fires

Several new electric fires with coal or log effects are announced by BERRY'S ELECTRIC, LTD., Touchbutton House, London, W.1. Among the lower-price range, the "Petaberry" has been designed with the most effective simplicity, while the "Juneberry" is essentially modern in outline, a warm glow visible through the slotted base adding depth to the "Magicoal" fire effect. Both models are of 2 kW loading and are supplied in either warm silver or gunmetal with polished rustless bar and element assembly. The prices are respectively £7 15s and £7 19s 6d, subject to purchase tax in this country.

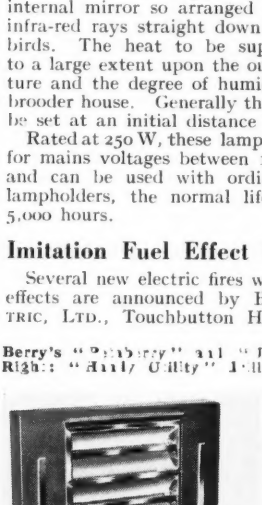
The "Masterberry" introduced last year is now available with a log effect as an alternative to coal, while an antique finish is offered as well as armour bright. The "Emberberry" log fire is now obtainable with Jacobean dogs for 15 gns.

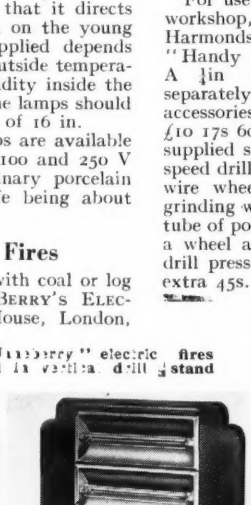
Two models have been specially designed for the American market. One is in the form of a lightly built basket for mounting on the customer's own dogs and has no heating elements. The other, which is period in character, has a 2 kW element incorporated in the front of the basket.

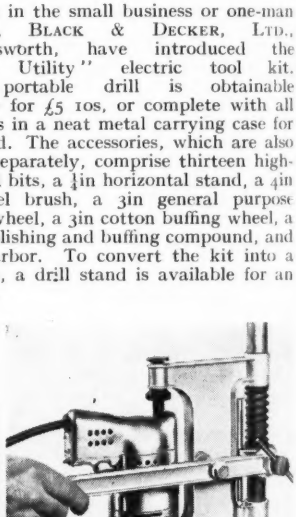
Portable Tool Kit

For use in the small business or one-man workshop, BLACK & DECKER, LTD., Harmondsworth, have introduced the "Handy Utility" electric tool kit. A ¼in portable drill is obtainable separately for £5 10s, or complete with all accessories in a neat metal carrying case for £10 17s 6d. The accessories, which are also supplied separately, comprise thirteen high-speed drill bits, a ¼in horizontal stand, a 4in wire wheel brush, a 3in general purpose grinding wheel, a 3in cotton buffing wheel, a tube of polishing and buffing compound, and a wheel arbor. To convert the kit into a drill press, a drill stand is available for an extra 45s.

Berry's "Petaberry" and "Juneberry" electric fires
Right: "Handy Utility" drill in vertical drill stand







ELECTRICAL CONTRACTING: Organization and Routine

By H. R. TAUNTON, A.M.I.E.E.

8—*The Technical Side*

It is not within our scope to discuss in detail the technical side of the electrical contractor's business, a field thoroughly covered by numerous writers. We need only consider here how to make the most effective use of technical training and experience, as part of his equipment, towards obtaining and consolidating a remunerative connection.

The extent of that equipment naturally varies with the size of the business. The heads of the bigger firms have—they have to have—a knowledge of modern applications of electricity as wide and varied as that of any consulting engineer. The little man in a provincial town, whose mainstay is the wiring of small shops and houses, can get along comfortably enough with a knowledge of Ohm's Law and the current catalogues. He must learn something more if he wants to be more than a little man. A contractor in a large way of business must be prepared to design and carry out installations of a hundred different types, each with its own problems of magnitude complexity, and sheer novelty.

A Wide Variety

Consider lighting alone. Architectural and decorative lighting, in which the conflicting claims of efficiency and effect have to be reconciled; elaborate calculations of spacing and intensity for offices and factories; shop-window lighting, floodlighting, signs: all these have their problems for the illumination expert.

In any big modern building there are all the motors for the lifts, the boiler house, pumping and ventilation plants. In the factory almost every machine calls for its motor. And with the spread of rural electrification, electricity is gradually taking over much heavy farm work.

Again, heating. In earlier days an occasional radiator, with fat "sausage" lamps, was to be met with in the houses of the more wealthy. To-day we have imitation fires, convectors, radiators, panels and tubes for every purpose. Electricity will inevitably displace in time present systems of water heating—a rich potential field for the contractor.

Domestic appliances in ever-increasing variety and number from kettles to refrigerators, wireless apparatus, clocks: all these and a score of other applications of electricity, each bring grist, in the shape of wiring and sales, to the mill of the contractor; but they all have their difficulties, with which he must be competent to deal.

Maintaining a Standard

The supplying of these various appliances is but the cream of his business, the smaller, though often the richer, part of it in profits. The bulk of his work, however, is the necessary wiring for them. That is his reason for existence. A draper could sell the appliances—drapers do—but he cannot install and maintain them.

Since wiring, then, is the essential backbone of his business, he must see to it that his wiring work conforms to a definite standard, as high as circumstances permit to him. It is by his characteristic work, his wiring, that the contractor is judged, and not by the appliances attached to it, the work of manufacturers. More particularly should the contractor newly started in business, or the established man confronted by a dwindling connection, concentrate on his wiring, decide upon a definite standard for it, and stick to it through thick and thin, stocking and buying for it, and training his men to it. He may be forced at times to lower it to comply with some architect's or builder's specification, but it is better to have a high standard and sometimes fall from it, than a low one and never rise above it.

The choice of a standard involves first the choice of a wiring system. Many of the possible systems differ only in their trade name; eliminating them, the remainder can be grouped in half a dozen classes:—

(*a*) Heavy-gauge screwed conduit, more or less completely iron-clad from main switch to fitting. (*b*) Light-gauge slip conduit, with continuity fittings of all degrees of efficiency—or the reverse. (*c*) Casing, wood or metal. (*d*) Twin or single wires, metal-sheathed. (*e*) Cab-tyre-sheathed wires. (*f*) V.i.r., enamelled, or bare wire, on insulators and cleats.

Probably 99 per cent of today's buildings are wired on one or other of these systems. Disregarding (*f*) which, though often the best for factories and similar buildings, where it can be run out of reach, is not suitable for general purposes; and (*c*), casing and capping, rarely used to-day except in special situations; we are left with (*a*) heavy conduit, (*b*) light conduit, (*d*) "lead-covered," and (*e*) cab-tyre.

Heavy-gauge conduit is, without question, the best system for most public buildings, offices, and the like, where mechanical protection against damage is an important consideration. Another advantage is that wires can be pulled in and out when necessary for repairs or extensions, though this claim is often defeated by bad practice.

Good Practice

A good high standard for a firm whose work calls for this system would be: heavy-gauge, welded, screwed, enamelled conduit, ⅝in minimum; no elbows or stock bends and tees; c.i. boxes with spouts or brass bushes and lock-nuts, at all outlets; the complete system to be continuous, properly bonded and efficiently earthed. All metal fittings, switches, etc., to be earthed to conduit. Accessories in bathrooms and similar places to be all-insulated. Sockets to be three-pin. Cables to be C.M.A., 600 megohm grade, rated for capacity in accordance with I.E.E. Rules. Fuseboards to be enclosed in c.i. cases, etc.

Such a standard will meet adequately the highest requirements of any but abnormally difficult positions. It is a desirable standard, but it is not a cheap one. Something more economical is needed by the contractor who caters mainly for the small consumer.

The light-gauge conduit system (*b*) and the various lead-covered systems (*d*) are certainly the two most popular systems for this class of work. Light-gauge conduit is essentially a cheaper substitute for heavy-gauge, giving less mechanical protection—but quite enough for many conditions—and less durability. It depends for the continuity which is essential with modern a.c. voltages on grip fittings of various designs. Those who adopt this system often economize, too, by using non-association grades of wire. Given good average workmanship, a sound and satisfactory job can be carried out with these materials. He whose normal work calls for this system can, within its limits, set himself a standard of which he need not be ashamed.

Lead-covered Systems

Nothing, however, gives the shoddy contractor so much scope for sheer bad work as "lead-covered." That is not the fault of the many excellent systems marketed by responsible cable makers. In good hands they can give good results: better sometimes than any other, particularly on the point of appearance. The weakness of all of them is that their efficiency depends entirely on the care taken to bond the system throughout. They all include as an essential feature a series of more or less ingenious and complicated junction boxes. Assuming that a conscientious contractor, and his foreman, and ultimately his wiremen, use them wherever needed—too often a generous assumption—we have still to reckon on the chances of broken clamps, damaged terminals, and missing screws, tempting to some sort of makeshift, which works loose as soon as the floor boards are screwed down. The result is a long tale of the familiar troubles: electrolysis, corrosion at clips, cracks and pinholes, overheating, and continual danger of breakdown, shock and fire.

It is rather surprising that more contractors catering for the cheaper class of installations do not adopt as their standard system the last on our list: (*e*) cab-tyre. Being neither metal sheathed nor protected, it dispenses with all need of bonding and earthing, and so with all the dangers attendant on neglect to do so.

It can be adequately protected against mechanical damage by metal capping, oval conduit or by being floated over with cement in chases. The usual objection to it, that it is difficult to make a neat surface job of it owing to its flexibility, can be largely met by using twin 1/044 flat instead of stranded circular.

Preparing a Scheme

As an example of the methods followed by a contractor in preparing a scheme to meet an open inquiry—typical methods, of course, for no two men will arrive at the same end by the same path—we will assume he has been asked by a friendly architect to prepare a scheme and estimate for the electrical installation in a new block of offices. The architect knows his man and trusts him. He will give him any pertinent information, and otherwise he will give him a free hand. With that, and a set of plans, the engineer sets to work.

The building is a seven-storey one, with a basement and a sub-basement. The ground floor, basement, and part of the sub-basement will be occupied by a bank: the landlord. The upper floors are to be let to tenants. The electrical requirements are (*a*) Complete lighting for the bank premises; (*b*) Local heating and small power for them; (*c*) Landlord's lighting (including caretaker's flat); (*d*) Landlord's power; (*e*) Tenants' mains; (*f*) Telephones, bells, etc.

The first step is to prepare complete schedules of lights for the landlord and the bank premises, based on the plans, which will be marked up to illustrate it. The illumination scheme will have to be discussed then or later with the architect, and perhaps his principals, and, it may be, modified; but the contractor will be relied upon for the technical points of efficiency. These two schedules, totalled, will give the load required by sections (*a*) and (*c*). Each will have its separate main switch-fuse and meter, and be an entirely distinct installation.

A third switch-fuse and meter will be wanted for the bank's small power requirements (*b*): radiators, fans and plugs for a kettle, sealing-wax heater, and so on. The landlord's power requirements (*d*) will comprise one or two lifts, motors for circulating pump, oil feeds to boiler, ventilating fans and the like. The total load can then be calculated, and the necessary control gear noted.

Coming now to the tenants' main (*e*): as the floors will probably not be partitioned or even let, no schedules are possible. The floor area will therefore have to be worked out, and a suitable wattage per square foot allowed and totalled. Similarly, an allowance will have to be made for small power points and heating supplementary to the central system, based on the cubic capacity of each floor. The total load thus ascertained will probably be the largest part of the whole.

The engineer will now find it advisable to consult the local office of the Electricity Board. It will probably want the load split up: perhaps on three phases, or perhaps on the two sides of a three-wire system. It may require the tenants' mains run back from each floor to a distributing centre, or two or three rising mains, tapping off on each floor.

At this point, knowing where the service will enter and having decided on the most convenient position for his main switchroom, he will probably have to break off and fight the architect for the requisite space, probably in the basement.

He has now to devise a suitable balance for the load on, shall we say, two sides of the service. He will secure it, so far as the tenants', the heavier, load is concerned, by connecting alternate floors to either side. The bank lighting may be approximately equal to the landlord's lighting. The landlord's power will mostly be across the outers. The bank's small power installation may have to be left unbalanced.

Diagram of Connections

The engineer is now in a position to prepare a diagram of connections, sketched on an elementary section of the building, showing the loads on each floor for each separate installation or balanced half of it. From these figures he can decide on the capacity of each controlling switch or breaker and the most convenient number and capacity of the necessary fuse-boards: all noted on his diagram, on their respective floors. For (*d*), he will indicate the positions of the various items (probably all in the basement or roof) with their suitable dis-board.

He has next to decide how he is going to provide for the tenants, always some-

thing of a problem. Some architects, or their clients, like a number of points tubed and wired for them on each floor, by way of a letting inducement; others content themselves with supplying the rising mains. Whatever the choice, he has now to decide what, if any, fuse-boards or, alternatively, link-boxes, he has to provide, and fill in his diagram accordingly.

He can then sketch in his mains and sub-mains and proceed to the consideration and due recording of their type and sizes. His diagram is then complete; and so, in all essentials, is his scheme.

He has only to consider the minor items of (*f*)—bells, telephones, burglar and fire alarms, perhaps, and mark up his plans to conform with the diagram. It will be easy for him then to dictate a detailed description of the whole; and that done, he is free to get on with his specification and, finally, his estimate.

We have taken a comparatively simple illustration. A theatre, a factory, or a job of overhead construction might be much more complex; but fundamentally the procedure would be the same.

Architect and Contractor

To work out a sound scheme and to describe it well and clearly, is one thing; to have it accepted is another. In the happy case we have taken, where the architect has given the contractor a free hand, he may be in a position also to give him the order without further ado. But, quite as likely, he may have to submit the scheme and the estimate to his client. The latter may accept the scheme on the architect's dictum, but he will not always swallow the estimate so easily and the architect may be told to obtain alternative estimates.

The situation will then develop in one of several familiar ways. This particular architect, who wants his selected contractor to get the order, will send out the inquiry to two or three other firms of about the same standing, with nothing more in the way of information than he gave the first. They will all get busy, and in due course each submit a scheme. Competition being in the air, it is highly improbable that any will be as full and satisfactory as the original one, and the estimates will be correspondingly lower.

The architect will pass them to his client, and one of three things will happen. If the client is foolish he will say, "This is the lowest. Accept it." He may be persuaded to let the first man quote again to one of the cheaper schemes. Most commonly, both he and his architect will be so befogged that they will decide to send the lot to a consultant for his opinion. He, almost certainly, will damn them all, and persuade the client to let him get out a completely new scheme and specification. This will be sent out, perhaps to the original three or four only, but, as likely to others as well. In the result, the client will probably pay 50 per cent more for a job no better essentially than that which the first scheme offered him.

Unpaid Consulting Work

Against any of these courses the contractors concerned have a legitimate grievance of unequal opportunities and wasted efforts. But worse may befall them. Some architects, and many others who want electrical work done, do not hesitate to ask a contractor to prepare a scheme and estimate, and then, adopting the former as their own, send it out to an indefinite number of his competitors in the hope of getting a lower price, as they almost invariably do. Rarely do they give him an opportunity of revising his price to meet this unfair competition and the only reward he has for his skill and experience, and the time and money he has spent, is the certainty of not getting the order. What the inquirer gains is his services as a consultant, without the expense of a consultant's fees.

The moral, the professional consultant will say, is that he, and not a contractor, should be employed by architects to prepare electrical schemes; but it is not practical politics. Consultants themselves would not want to be bothered with the hundreds of small jobs where the evil is most pronounced. In most cases, the fairest procedure would be for the architect to invite a selected contractor to prepare a scheme and specification *without* an estimate, on the understanding that he will later, with a limited number of other firms, be asked to quote to it. The slight advantage which the contractor would have in quoting to his own specification would be his fair recompense for his work in preparing it.

Overseas Electrical Trade

Increased Exports in May

ALTHOUGH almost £2,000,000 higher than the April figure, exports of electrical apparatus and machinery during May at £11,029,024 were still some way below March's record total of £11,816,984. Compared with May last year there was an advance of £674,624, attributable to an increase in sales of electrical machinery from £3,007,526 to £3,938,395: shipments of electrical goods and apparatus declined from £7,005,037 to £6,706,386.

Russia still heads the list of purchasers of generating plant, the value of equipment bought (£554,637) being over twice that dispatched in May last year. It is gratifying to note that Canada (£76,822) is now the fourth largest buyer in this class, coming after Australia (£135,066) and India (£123,040). Exports of generating plant as a whole rose from £762,405 to £1,386,150.

Sales of motors were somewhat reduced, £712,182 compared with £807,195 in May last year. The best markets were Australia (£128,748), India (£61,125), South Africa (£50,711) and Holland (£45,041). Canada bought £17,696 worth. Out of a total of £1,840,063 (£1,437,926) of other electrical machinery South Africa increased

TABLE I—ELECTRICAL EXPORTS

Class	May, 1950	May, 1949
	£	£
Telegraph and telephone cables and wires (submarine)	66,307	24,203
Ditto, not submarine	626,248	609,487
Wires and cables, cotton, silk or artificial silk insulated	46,849	83,376
Ditto, enamel, glass or asbestos insulated	50,315	131,687
Ditto, paper insulated	649,392	817,824
Ditto, rubber insulated	286,036	489,638
Ditto, other	128,533	128,802
Commercial radio apparatus	425,632	273,395
Domestic radio apparatus	200,522	280,509
Telegraph, telephone and signalling apparatus	1,420,250	1,273,799
Radio loudspeakers	44,781	21,592
Sound reproducing apparatus, components and parts other than cinematograph apparatus	301,845	249,726
Other sound reproducing apparatus	77,739	46,984
Radio valves	217,761	180,596
Electric lighting carbons	23,376	16,893
Lamps not exceeding 24 V.	28,307	37,386
Discharge lamps	24,458	28,852
Other lamps	64,820	77,679
Other lighting apparatus	294,788	400,535
Primary batteries	78,736	99,364
Parts other than carbons	20,323	25,857
Accumulators for motor vehicles	160,555	150,014
Ditto, traction	11,075	6,132
Ditto, radio	1,335	10,212
Other portable accumulators	37,992	33,360
All other accumulators	131,634	39,708
Parts and accessories	59,047	88,538
Cooking appliances	90,068	138,988
Heating appliances	51,567	63,286
Parts and accessories for cooking and heating appliances	39,034	40,683
Flat irons	37,866	44,065
Commercial electrical instruments	88,043	98,340
House service meters	109,897	156,451
Time recorders and time switches	15,624	22,682
Other electrical instruments	116,874	92,582
Electro-medical apparatus (not X-ray)	39,895	33,268
X-ray apparatus, tubes and parts	40,610	59,749
Permanent magnets	18,310	16,923
Insulating cloth and tape	82,838	67,449
Other insulating materials	90,001	79,950
Unclassified electrical goods and apparatus	407,103	455,473
TOTAL electrical goods and apparatus	6,706,386	7,005,037
Generators, up to 200 kW	945,962	541,479
Ditto, over 200 kW	238,045	147,224
Ditto, parts	202,143	73,702
Motors, railway and tramway	23,744	9,426
Ditto, other, not over ¼ h.p.	83,121	112,126
Ditto, over ¼ h.p. but under 1 h.p.	40,459	45,757
Ditto, from 1 h.p. to 250 h.p.	456,407	522,529
Ditto, over 250 h.p.	44,887	35,580
Ditto, parts	63,564	81,777
Converting machinery	11,662	6,668
Transformers, including coils	609,210	450,383
Rectifiers for power house use	17,022	30,700
Motor starting and controlling gear	193,447	198,581
Switchgear and switchboards (not telegraph or telephone)	939,000	727,825
Other electrical machinery	69,722	23,769
TOTAL electrical machinery	3,938,395	3,007,526
Vacuum cleaners and parts	225,995	186,058
Other electrically operated portable appliances	72,661	82,734
Portable electric tools	85,587	73,045
GRAND TOTAL	11,029,024	10,354,400

its purchases from £287,035 to £426,735.

Reductions from £1,055,989 to £486,991 and from £931,966 to £498,999 in shipments of electrical goods and apparatus to India and South Africa respectively were counterbalanced principally by improved business with the comparatively small customers. Australia, the biggest buyer, maintained its purchases at practically the same level as in the corresponding month last year—£890,435 compared with £881,696. New Zealand bought £79,070 worth more and other outstandingly good markets were Holland, Sweden, Argentina, Canada, Denmark and Brazil. Though still comparatively small, sales to the United States rose from £13,617 to £34,755.

Among the individual classifications an interesting item was the buying by Egypt of £142,470 worth of cables and wire (other than telegraph and telephone). This purchase was second only to that of Australia (£174,775) and went some way towards offsetting the decline in sales to India (from £477,657 to £132,212), South Africa (from £187,242 to £97,451) and Venezuela (from £71,880 to £11,823).

Commercial radio apparatus was in demand, £425,632 worth being exported compared with £273,395. Sweden (£100,426), France (£49,290) and Holland (£41,826) were the best customers. The decline in sales of domestic radio sets continued, but the demand for telegraph and telephone equipment was sustained, Australia, New Zealand and South Africa taking £385,096, £156,462 and £104,796 worth respectively out of a total of £1,420,250.

Holland and the United States supplied respectively £138,649 and £116,315 of the £403,656 worth of electrical goods and apparatus imported (against £294,725 in May, 1949). The principal items were electronic valves and cathode ray tubes (£97,973), radio communication and navigational aid equipment (£45,332) and furnace carbons (£41,315). Electrical machinery imports included generators £42,099 (£28,543), motors £34,044 (£29,065), and other sorts £13,845 (£18,338).

TABLE II—DISTRIBUTION OF ELECTRICAL GOODS AND APPARATUS

Destination	May, 1950	May, 1949
	£	£
Channel Islands	40,459	36,187
Malta and Gozo	23,651	36,368
Cyprus	9,825	20,396
British West Africa ...	98,649	141,575
Union of South Africa ...	498,999	931,966
Northern Rhodesia ...	31,917	14,381
Southern Rhodesia ...	62,267	101,402
British East Africa ...	151,241	111,124
Bahrein, Koweit, Qatar and Trucial Oman	46,888	54,853
India	486,991	1,055,989
Pakistan	140,178	150,176
Malaya	272,937	217,946
Ceylon	77,052	53,927
Hong Kong	91,721	159,915
Australia	890,438	881,696
New Zealand	412,177	333,107
Canada	180,246	95,454
British West Indies ...	77,488	81,425
Anglo-Egyptian Sudan ...	11,062	25,345
Other Commonwealth Countries	90,390	56,047
Irish Republic	290,954	203,879
Soviet Union	17,968	63,619
Finland	27,503	28,303
Sweden	227,006	122,632
Norway	128,143	123,521
Iceland	9,781	22,884
Denmark	155,351	99,982
Poland	72,893	70,695
Germany	28,227	17,612
Netherlands	290,089	115,236
Belgium	81,894	78,123
France	112,979	74,372
Switzerland	31,949	28,225
Portugal	107,600	81,655
Spain	25,201	13,040
Italy	65,099	17,049
Austria	36,596	12,974
Hungary	15,519	25,630
Czechoslovakia	4,520	13,542
Greece	59,217	107,101
Turkey	45,903	54,804
Indonesia*	12,390	22,883
Netherlands Antilles ...	2,213	11,232
Portuguese East Africa ...	8,659	8,437
Syria	3,178	63,892
Lebanon	18,287	36,667
Israel	15,794	49,084
Egypt	267,752	275,115
Arabia	20,713	10,252
Iraq	36,192	32,442
Iran	108,851	86,851
Burma	47,105	22,275
Thailand	38,336	26,851
China	1,463	12,103
United States of America	34,755	13,617
Mexico	3,751	8,149
Colombia	9,013	2,471
Venezuela	56,959	130,287
Chile	12,636	12,798
Brazil	140,442	84,818
Uruguay	17,629	28,560
Argentine Republic ...	226,960	3,004
Other Foreign Countries...	94,340	128,092
TOTAL	6,706,386	7,005,037

* Includes Netherlands New Guinea in 1949.

I.E.E. London Students

ON Sunday, 9th July, the London Students' Section of the Institution of Electrical Engineers is holding its summer outing, when a trip will be made on the Thames from Kingston to Runnymede. Tickets (11s each) are still available and the charge for lunch will be 3s 6d, and tea 2s for those requiring meals. Applications should be sent to Mr. K. W. Wardrop, 28, Clayhill Avenue, Ilford, Essex.

The concluding parts of the Young Trophy Competition are to be played on the King's College ground, Lavender Avenue, Mitcham. The I.E.E. London Students' cricket team will be playing on the 15th and 22nd July. The last cricket match between the "Civils" and "Mechanicals" and the "three-cornered" tennis match will be played on 29th July.

Commerce and Industry

Productivity Conference
Electricians' Wage Increase

ON 15th and 16th November the Utilization Section of the Institution of Electrical Engineers is to hold a conference on "Electricity as an aid to Productivity," in order to provide industry with the most up-to-date information concerning the contribution that factory electrification can make to increased production.

The conference will consist of a series of lectures followed by a general discussion. The lectures will cover in general terms what electricity can do to increase production rather than give full technical details of the apparatus with which these improvements can be achieved. The subject matter of the lectures will come under the following broad headings: (a) Motive power in the factory; (b) industrial heating processes; (c) welding applications; and (d) lighting, heating and ventilation.

Fibreglass New London Offices

Last week Fibreglass, Ltd., opened new offices at the Westminster Bank building, 63-65, Piccadilly, London, W.1, consisting of a central space for the display of products surrounded by individual offices, typists' accommodation and a conference room. The decoration is in pastel shades of blue, grey, red and yellow, the grey carpet being relieved by black and white fur rugs.

The ceilings of the main space and of the conference room, and the walls of the typists' space, have been treated for noise absorption with 1.5in of "Fibreglass" resin-bonded wool faced with perforated hardboard. The furniture is in natural-finished mahogany with birch veneers, and all the windows are curtained with woven glass fabrics, which are of course fireproof.

In the display space there is an array of manufactured articles and products containing glass fibres, together with sectioned models illustrating the uses of "Fibreglass" insulators, while on the wall an "exploded" view of an electric motor shows all the components in which "Fibreglass" textiles are used.

Corner of the display space at the new Fibreglass London offices

"Selling" Teams at Exhibition

Four salesmen and four lady demonstrators employed by the North Western Electricity Board received presentation pencils on 6th June as a token of the Board's appreciation of a successful selling scheme organized by the Commercial Department in connection with the recent "Brighter Homes" Exhibition in Manchester. One day was allotted by ballot to each of four of the Board's Sub-Areas concerned in the exhibition, to see which Sub-Area team produced the best selling results from the Board's stand. Points were awarded according to the type of apparatus sold and inquiries received and the winning team, in a close competition, proved to be No. 2 Sub-Area. The presentation was made by the chief commercial officer, Mr. A. O. Johnson, at an E.D.A. Sales Conference

of sixty members of sales staffs from all parts of the Board's area, held in the Manchester Service Centre.

G.E.C. in Canada

It is reported in *Electrical News and Engineering* (Toronto) that the General Electric Co., Ltd. (London), has formed a Canadian subsidiary—the British General Electric Co. (Canadian), Ltd.—to distribute its products in Canada. An existing company, Fraser & Chalmers, Canada, Ltd., will continue to handle steam turbines, turboblowers and mining equipment manufactured by the Fraser & Chalmers works at Erith, Kent.

Electricians' Wage Increase

From 3rd July the wage rates of journeymen electricians are to be increased by 2d an hour to 3s 4d in the London area; by 1½d to 3s 1d in the Merseyside district; and by 1½d to 3s in other areas. Proportional increases are to be received by adult males and operatives under 21. It is recalled that towards the end of 1949 the Electrical Trades Union put forward a claim for a "substantial" increase in wages for electrical contracting operatives and the claim went to arbitration. The National Arbitration Tribunal re-emphasized the opinion expressed in a previous award that the industry was one in which a production incentive scheme should operate, and accordingly deferred its decision for six months so that negotiations could take place. Both parties now express the view that the industry is not one for which such a scheme can be devised. In a note on the increase in wages now agreed with the E.T.U. (which has withdrawn its claim to the National Arbitration Tribunal) the N.F.E.A. says the weight of evidence clearly showed that the earnings of electrical operatives were not keeping pace with those of industrial workers generally.

Consideration has also been given to the country allowance, having regard to the amounts paid under this heading in other industries, and it has been agreed to increase the allowance to 5s 6d a night as from 1st August.

Hydro-Electric Plant for Spain

The Metropolitan-Vickers Electrical Co., Ltd., has secured a large contract for the supply of hydro-electric machinery to the Saltos del Sil, S.A., undertaking for the San Esteban power station on the River Sil in north-western Spain. The project envisages the installation of four 90,000 h.p. generating units, the initial order comprising three generators, together with the necessary power transformers and switchgear. The value of the electrical portion of the contract is in excess of £1,300,000. The contract for the hydraulic turbines has been obtained by Aktiebolaget Karlstads Mekaniska Werkstad of Sweden. The order was secured in the face of world-wide competition.

Royal Counties Show

The Southern Electricity Board had an impressive display of the latest agricultural and horticultural equipment and domestic appliances at the Royal Counties and Sussex County Agricultural Societies Show, held at Bognor Regis on 21st-24th June. The layout and organization of the Board's exhibit at the show was carried out mainly by the Chichester District under the direction of Mr. A. H. Watson, commercial officer, No. 4 (Portsmouth) Sub-Area, Mr. H. E. Taunt, district manager, Mr. P. W. Dorn, district commercial officer, and Mr. G. D. Print, agricultural adviser.

A group outside the stand of the Southern Electricity Board at the Royal Counties Show held at Bognor Regis

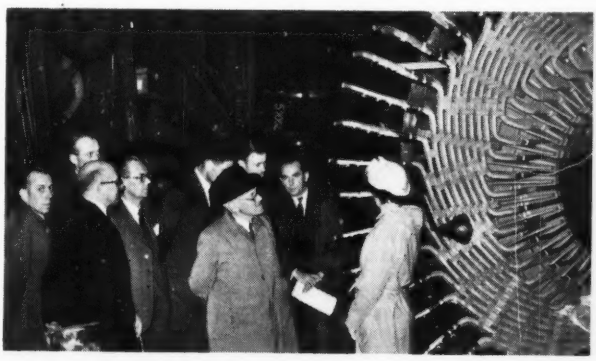
No. 3 Portsmouth) Sub-Area. The accompanying picture, taken on the opening day, shows Mrs. Watson, Mrs. Logan, Mrs. Kennedy, Mr. H. E. Taunt, Mr. H. R. J. Baigent agricultural development officer, Mr. Jellicoe, Lt.-Col. D. S. Kennedy, member of the Southern Electricity Board, Mrs. Jellicoe, Mr. F. W. Kempton, secretary, S.E.B. Mr. E. A. Logan, manager No. 3 (Portsmouth) Sub-Area, and Mr. A. H. Watson.

Engineers' Ballot

At the annual meeting of the National Committee of the Amalgamated Engineering Union at Blackpool last week the general secretary, Mr. Ben Gardner, announced the result of the ballot (so far as A.E.U. members are concerned) on the question of strike action in support of the £1 a week wage increase. He said that 143,579 had voted in favour of submitting the claim to arbitration and 51,280 for a strike. The Transport and General Workers' Union and the National Union of General and Municipal Workers have also announced majorities against a strike. It is therefore practically certain that the overall vote of the Confederation of Shipbuilding and Engineering Unions will favour submission of the claim to arbitration. The result of the ballot will be made known at a meeting of the Confederation at York on 13th July.

"Mechanicals" at Witton Works

On 21st June, the opening day of the Birmingham Summer Meeting of the Institution of Mechanical Engineers, members and their ladies, under the leadership of Mr. G. Varley (member of Council) were the guests of the General Electric Co., Ltd. The visitors were entertained to lunch at the Midland Hotel, where they were received by Dr. C. C. Garrard, resident director, Mrs. Garrard and senior officials of the company with their wives. After lunch the party was taken by coach to the Witton works and escorted through many of the factories. The tour also included the company's high power testing station and 2½ million V laboratory, where a demonstration of extra high voltage phenomena was given. The visit closed with an informal tea at the Magnet Club, when each lady received a souvenir gift of an electric travelling iron.



Dr. C. C. Garrard shows members of the Institution of Mechanical Engineers one of the 30 MW alternators for the Huncoat power station

Tir John Claim Rejected

The arbitrator appointed to consider the claim that conditions at Tir John (Swansea) power station justified the continuance of the 10 per cent pay addition has recently made known his decision. It was contended by the trade-union side of the N.J.I.C. that the fuel used at the station (pulverized anthracite duff) produced an excessive quantity of dirt and dust and that in consequence the premises were dirty, injury was caused to clothing and there was a risk of contracting disease. They argued that this was the reason for the 10 per cent addition originally granted, that conditions had not improved, and that the 10 per cent should therefore not be merged in the general advance. For the management side it was stated that the 10 per cent was part of an extra payment made for local reasons by Swansea Corporation, and that Tir John was not in existence when it was first agreed upon. The arbitrator, after visiting two stations where it was agreed by the parties that conditions were normal, was satisfied that Tir John was as free from dust and dirt as the others and awarded against the claim.

Royal Highland Show

The Royal Highland Show held at Paisley from 20th-23rd June included an exhibit organized jointly by the Electrical Development Association and the South West Scotland and South East Scotland Electricity Boards, to enable visiting farmers to realize

what a wide range of electrical equipment is available for speeding up production and generally easing the work on the farm, as well as in the farmhouse. In a large covered stand was grouped electrical equipment for use in the dairy, poultry house, barn, workshop, the home and horticultural houses, as well as battery-electric vehicles of interest to the farmer. A feature of the approach to the stand was a large ornamental electric fountain demonstrating the use of large pumping equipment.

Apprentices in Contracting Industry

Mr. L. C. Penwill, director and secretary of the National Federated Electrical Association, has informed members that the national apprenticeship scheme for the industry will come into operation on 1st September next.

With regard to interrupted apprenticeships, a new agreement has now been negotiated to cover those who do not complete their training before serving in the Forces, but who have reinstatement rights with their former employers. In most cases the apprentice will have passed the age of 21 before his training is completed, and the new agreement (which operates from 3rd July) is necessary because there is no provision under existing agreements as to the wage rates payable.

Although not the subject of an agreement with the E.T.U., wage rates for boys aged 15 years have been recommended by the N.F.E.A.

Lead Price Reduced

On Saturday last the price of lead was reduced by £4 a ton to £92.

Another Seattle Contract

A *Reuter* report from Washington states that the Seattle City Council has invited British and other foreign firms to submit bids for the supply of six transformers. Early this year the city's purchasing agent rejected a $550,242 (£196,486) tender by Ferranti, Ltd., for supplying six transformers for the city's Ross Power Dam, the award going to the American General Electric Company for $751,000 (£265,357). The reason given for the rejection of the British tender was that it did not comply with specifications. The British Consul in Seattle entered a formal protest. On 24th May the city council approved a policy which would have given American concerns a 25 per cent differential on city purchases, but two days later revoked the measure.

The transformers now required are part of the second instalment of the municipal power programme, and the city purchasing agent, Mr. Paul Hendricks, specifically announced that there would be no bar against foreign tenders. He added that to be awarded the contract a firm would have to offer a 100 per cent performance guarantee. The equipment would also have to comply with American standards. Two British firms who have resident representatives in Seattle, Ferranti, Ltd., and the English Electric Co., Ltd., have been invited to submit bids, and it is expected that Swiss, French and Belgian firms will compete for the order, which will cost not less than $200,000. Tenders will be opened by representatives of the city council on 16th August.

Tannoy Products

Arrangements have been made whereby the assets, undertaking and goodwill of Tannoy Products have been acquired by Sound Rentals, Ltd. The Tannoy organization will continue as previously under the title Tannoy Products (Sound Rentals, Ltd.), of which Mr. G. R. Fountain, the founder of Tannoy, is chairman and governing director. The receiver and manager, appointed in March, 1948, has been released.

Works Visit

Over seventy members of the Association of Mining Electrical and Mechanical Engineers, accompanied by their ladies, spent a day at the works of Chloride Batteries, Ltd., Clifton Junction, near Manchester, on 20th June, during the Association's annual conference at Buxton. The delegates, amongst whom was Mr. R. Crawford, president-elect of the Association, arrived in special coaches and were welcomed by Mr. E. Powell, Exide sales manager, and Mr. C. Pritchett, commercial manager. After a short introductory talk by Mr. Pritchett, the delegates were taken in small groups round the works, while the ladies were conducted on a special tour through the factory's medical, welfare and recreational buildings. At lunch Mr. A. W. Browne, chairman of Chloride Batteries, presided.

Brook Motors Film

A new twenty-minute film, "Power Without Smoke—Transition in Textiles," has been sponsored by Brook Motors, Ltd. Various aspects of wool and worsted cloth manufacture are covered by the film, from the raw wool to the finishing processes. Twelve Yorkshire textile mills have co-operated in its making and most of the main sequences have been taken there. Graphs

have been introduced to clarify such points as the load characteristics of spinning mills, for which a special motor has been developed, and speed variations in line shaft driving.

Intended as an instructional and technical film, advertising has been kept to the minimum and no direct reference is made to the firm's products apart from the usual credits at the beginning of the film. Copies of the film in either 16 mm (or 35 mm by special arrangement) will be available on free loan from the Publicity Department Film Library, Brook Motors, Ltd., Empress Works, Huddersfield.

Trade Announcements

Ardente Acoustic Laboratories, Ltd., are returning to London on 1st July. Their new factory address is 62, Horn Lane, Acton, London, W.3 (telephone: Acorn 1282), and the sales office address is 309, Oxford Street, London, W.1 (telephone: Mayfair 7917).

From tomorrow (Saturday), the address of **D.H.S. Electrical Products, Ltd.,** will be 70, Culford Road, Kingsland, London, N.1 (telephone: Clissold 0426).

Acoustic Products, Ltd., are now installed in their new factories at Stonefield Way, Victoria Road, South Ruislip (telephone: Ruislip 6093).

F. Westerman (Wholesale), Ltd., have been appointed main stockists for Wolf tools.

A new depot has been opened by **E. Dawson (Lamp Factors), Ltd.,** at 111, The Brook, Chatham, under the charge of Mr. A. R. Yates.

In our last week's note on the appointment of an area representative for South Wales, etc., by **Clang, Ltd.,** the company's name was incorrectly spelt.

A new branch office of **Tufnol, Ltd.,** has been opened at 6, Clare Street, Bristol, 1 (telephone: Bristol 23304). The manager of the new branch is Mr. W. L. Tout, who has been resident engineer for Tufnol in the West Country since 1945.

From 1st July, the address of the Swansea depot of **Simpson, Baker & Co., Ltd.,** will be Pipe House Wharf, Swansea.

Cable Workers' Classification

At a meeting of the Standing Joint Committee appointed by the Joint Industrial Council for the Electrical Cable Making Industry, agreement was reached upon proposed schedules of classifications of occupations applicable to male and female workers engaged in the manufacture of covered conductors, and the Joint Industrial Council will receive a recommendation from the Committee at its meeting on 19th July that the schedules shall be adopted by the Council, and that any changes in rates of wages consequent upon their adoption shall come into effect on the third pay-day in July in respect of the period for which payment is made on that pay-day.

Changes of Address

The headquarters of the Department of Scientific & Industrial Research have been moved to Charles House, 5-11, Regent Street, London, S.W.1. The telephone number remains unchanged.

The offices of the Society of Relay Engineers have been transferred to Albion Road, Kettering (telephone: Kettering 3422).

The East Sussex & South West Kent Sub-Area headquarters of the South Eastern Electricity Board are now at "Westlords," Willingdon Road, Eastbourne (telephone: Eastbourne 6200).

H.F. Heating Exhibition

To widen manufacturers' knowledge of modern high-frequency heating equipment the General Electric Co., Ltd., has arranged a series of exhibitions of its new 2 kW generators for induction heating and plastic pre-heating. These exhibitions are being held at some of the company's branches and the first three are as follows: 28th June-7th July, Magnet House, Moor Street, Birmingham. 11th-12th July, West Bridge, Leicester. 19th-20th July, Magnet House, Kingsway, Cardiff.

Catalogues and Lists

Rich & Pattison (B'ham), Ltd., 81, Jamaica Row, Birmingham, 5.—Price list of conduit fittings.

Sturtevant Engineering Co., Ltd., Southern House, Cannon Street, London, E.C.4.—Catalogue (No. 3002) of industrial propeller-type fans, and technical brochure (No. 3501) on mechanical draught.

Metway Electric Industries, Ltd., King Street, Brighton, 1, Sussex.—Three catalogues of cast brass marine watertight plugs and sockets, immersion kettle elements and domestic appliances, and steel conduit.

British Aluminium Co., Ltd., Salisbury House, London, E.C.2.—Illustrated brochure depicting the application of aluminium in industry generally.

Synthetic Carbon & Engineering Co., Ltd., Cumberland Road, Stanmore Road, Middlesex.—Catalogue of carbon brushes, carbon components, controller parts and contacts, and brush holders.

Carter & Co. (Nelson), Ltd., Nelson, Lancs.—Catalogue of fire alarm equipment.

NEW BOOKS

Data and Circuits of Receiver and Amplifier Valves. Book II. Philips Technical Library. Pp. 409; figs. Cleaver Hume Press, Ltd., 42a, South Audley Street, London, W.1. Price 21s.

This book is a compilation of data on the Philips E series of side-contact valves made in 1933-39, together with the cathode-ray tubes, stabilizers, etc., brought out in the same period. Some circuits are given and some Philips test instruments described. After some general remarks on good circuit practice, ratings, etc., each valve is described, and any peculiarities of its construction or performance noted. Examples are the use of secondary emission in the E.E.1 and the use of aligned grids for noise reduction. Schematic circuits are given for each valve, and at the end of the book there are circuits for complete receivers and amplifiers.

As this book was first published in Holland in 1940 it is hard to find justification for translating it into English now. The valves described are nearly all obsolete, and the circuits bear little relation to modern practice. The information on instruments is confined to the headings one would expect to find in a manufacturer's catalogue sheet. In fact, the book is an elaborate and rather expensive catalogue.—A. H. B.

Questions and Answers on Electric Arc Welding. By E. Crawford. Pp. 112; figs. 62; index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.1. Price 5s.

This inexpensive pocket-sized book provides a condensed course of study for all those who are interested in the theory and practice of electric arc welding. It comprises a series of carefully selected questions and answers arranged in logical sequence and deals with plant, equipment, protective devices, electrodes, arc welding methods and technique, specialized types of electric arc welding—including automatic, atomic hydrogen, high-frequency welding, and the welding of non-ferrous metals.—R. P.

Mechanics for the Home Student. By E. N. Simons in association with W. D. Burnet. Pp. 151; figs. 132; index. Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1.

A definite purpose is served by this work which outlines elementary laws of mechanics in a way which will be comprehended by anyone, and is intended for those who are unable to attend classes of organized instruction. It is written in a clear and concise manner without resort to involved mathematics and complicated geometrical diagrams.

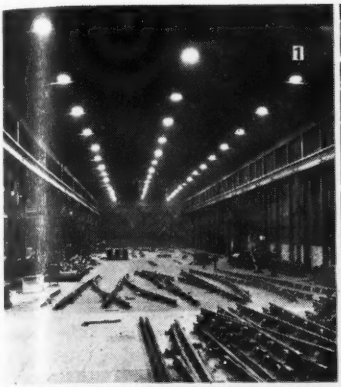
With the aid of this book the beginner should be provided with a full understanding of the fundamentals of mechanics.

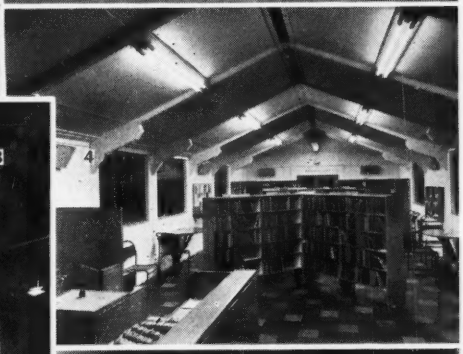
A.P.L.E. Conference

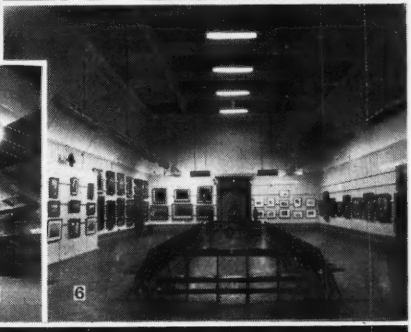
THE annual meeting and conference of the Association of Public Lighting Engineers, to be held this year at Bournemouth from 18th to 22nd September, will be well attended, judging by the number of delegates already appointed by local authorities throughout the country. Gas and Electricity Boards will also be represented and numerous overseas visitors have already notified their intention of attending the Conference.

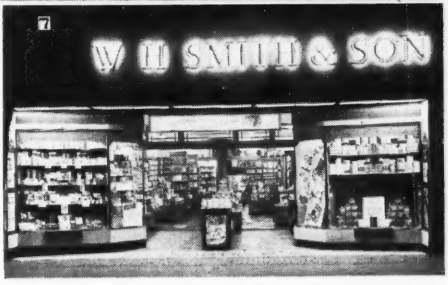
The conference sessions, at which papers will be read on all aspects of public lighting, will be held in the Winter Gardens, while street lighting apparatus and equipment will be displayed in an exhibition at the Town Hall. In addition there will be an outdoor display of lamp columns, class "A" and "B" bollards, traffic signs, motor tower waggons and extending ladders.

(1) Combination of mercury discharge lighting and gas filled lamps at works of Darlington Railway Plant & Foundry Co., Ltd. (Metropolitan Vickers Electrical Co., Ltd.). (2) Fluorescent lighting in the Ulster Knitting Mills (General Electric Co., Ltd.). (3) Special decorative "Mazda" fittings installed in St. Winefride's Church, Wimbledon (British Thomson-Houston Co., Ltd.). (4) Fluorescent lighting using 5ft 80 W units at the prefabricated North End Road Library, Fulham (Ekco-Ensign Electric, Ltd.). (5) Reflector-bowl fittings at the new Neston factory of the Morgan Crucible Co., Ltd. (Holophane, Ltd.). (6) Uniform lighting at the Camberwell Art Gallery (Thorn Electrical Industries, Ltd.). (7) A good example of window lighting at the Kingsway, London, W.C.2, branch of W. H. Smith & Son, Ltd. (Siemens Electric Lamps & Supplies, Ltd.).









Recent Lighting Installations

A Variety of Applications

(See opposite page)

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

REPORTS AND DIVIDENDS

British Insulated Callender's Cables, Ltd.—The annual meeting will be held on 13th July. In his statement issued with the report and accounts Sir Alexander Roger (chairman) says that the raw materials problem which previously confronted them largely disappeared in 1949 and they were able to achieve virtually maximum production of many of their products. With the general rate of incoming orders falling behind the record production rates, most of their heavy backlog of orders has been cleared, and by the end of 1949 they were in a position to quote competitive deliveries for practically all products.

The production of power cables has been one of the outstanding features of 1949, as it exceeded the high figure of 1948, while the output of super-tension cable easily surpassed any previous figure. In the telecommunications cables division the production of dry-core telephone and switchboard cables and wires was above the high level achieved in 1948. Another important feature was their entry into the co-axial cable field. The output of their wire mill division was satisfactory, embodying an appreciable expansion in aluminium products. There was a slight fall in production in their rubber and thermoplastic division, due to a decline in the demand from the building and mining industries. There was a marked increase in the demand for the small type of thermoplastic insulated and sheathed wires. Their engineering division also felt the effect of the falling off in demand from the building and mining industries, but this was largely offset by increased business in railway and other traction fittings. In the capacitor division the high output of power factor correction capacitors was maintained, but there was a fall in the production of other types following the recession in the radio industry in the first part of 1949, and a general curtailment of orders for fluorescent and discharge lighting capacitors.

The turnover of the B.I.C.C. group shows an increase of over £6 million as compared with 1948. Increased prices of metals account to some extent for the higher value of turnover, but there has also been a real increase in the output volume of some of their main products. Direct exports of the group amounted to £16.5 million, an increase of 28 per cent over the previous year, an agreeable proportion of which has accrued from countries in which they previously have done little or no business. This is essential as in several of their oldest markets local manufacture of some of their products is being more and more established, while in other markets political conditions and currency difficulties are restricting, and in some cases, making impossible, the purchase of imported goods. Competition is becoming keener, with Germany, Italy and Japan entering the lists.

Among the orders received during the year Sir Alexander mentions work for the B.E.A., the Area Electricity Boards and the North of Scotland Hydro-Electric Board, particularly the e.h.v. experimental line at Leatherhead, large telecommunication cable installations undertaken for the Post Office, the 750ft television mast erected at Sutton Coldfield, the railway electrification contract for the Liverpool Street to Shenfield line and other electrification schemes both at home and abroad.

Regarding the outlook, the first three months of 1950 show little overall change, but while orders in hand for some products remain at a high level, the demand for others has fallen substantially and the total orders outstanding are lower than twelve months ago. The immediate outlook is not so assured as it was a year ago. At home there has been a change from the sellers' to the buyers' market, accentuated to some extent in their industry by cuts imposed by the Government on the capital expenditure of their principal customer groups, the nationalized industries, following the devaluation of sterling.

The Automatic Telephone & Electric Co., Ltd.—In his statement issued with the report and accounts, Sir Alexander Roger (chairman) says that Communication Systems, Ltd., which now handles their home sales and rental business in private and intercommunication telephones, and public address systems, has had a satisfactory first full year's working. A trading loss was made by Elexcel, Ltd., due to reduced activity resulting from the continuing shortage of electricity, the slow progress of the re-housing programme, and heavy purchase tax. Hivac, Ltd., their electronic division, has again had a successful year. Their overseas sales companies have shown satisfactory results, and shortly after the end of the year a new subsidiary was formed in Nairobi to represent their interests in East

and Central Africa. In Portugal, difficult problems have been solved and new tariff rates for the State and concessionaire systems have been established.

Their sales turnover continued at a satisfactory level, 40 per cent being for the home market and 60 per cent for export. The programme of the British Post Office, their largest customer, has been considerably reduced by the Government, and little can be done to overtake the arrears of waiting telephone subscribers, who now, on published figures, exceed 550,000, but whose potential number is probably one million or more. In the radio and line transmission fields a special division has been established.

The **Brush Electrical Engineering Co., Ltd.**, proposes that a first step should be taken towards the refunding of bank loans by the provision of permanent capital, and arrangements are being made for a "rights" issue to stockholders consisting of 3,200,000 ordinary 5s shares at par in the proportion of two shares for every £1 of ordinary stock held. Application has been made to the Capital Issues Committee for consent to the issue. An extraordinary meeting will be held on 4th July for the purpose of raising the authorized capital to £4,000,000.

The **Revo Electric Co., Ltd.**, reports a profit, after deducting all charges, including £122,538 for taxation, of £113,719 for the year ended 31st March, as compared with £153,775 for the preceding year. It is proposed to pay a final dividend of 12½ per cent, plus a cash bonus of 10 per cent, maintaining the distribution for the year at 27½ per cent.

W. & T. Avery, Ltd., report a group profit, after providing £752,201 for United Kingdom taxation, of £557,202 for the year ended 31st March last, as compared with £481,238 for 1948-49. The amount of the group profit attributable to members of W. & T. Avery is £546,842 (against £475,677). It is proposed to pay a final ordinary dividend of 15 per cent, making 20 per cent for the year (unchanged). The balance carried forward is £204,983 (against £226,125 brought in).

The **Anglo-Portuguese Telephone Co., Ltd.**—Particulars were announced last week of the issue of £1,000,000 5 per cent first debenture stock, 1962-67. The stock is being subscribed at 97½ by the Telephone & General Trust. The issue is being made concurrently with a "rights" issue of 400,625 ordinary £1 shares at 21s each, and of the proceeds £768,000 will be applied to repay the unsecured loan from Telephone & General Trust, Ltd.

The **Electric Construction Co., Ltd.**, reports a net profit for the year ended 31st March last of £95,120, as compared with £49,719 for the previous year. General reserve receives £20,000, plant replacement reserve £20,000 and superannuation fund £20,000. The ordinary dividend for the year is again 12½ per cent, but in addition this year a bonus of 2½ per cent is paid. The balance carried forward is £47,505 (against £43,460 brought in).

Greenwood & Batley, Ltd., report a profit for the year ended 31st March last of £63,962, as compared with £44,261 for the previous year. General reserves receive £20,000, and it is proposed to pay a final ordinary dividend of 10 per cent, making 15 per cent for the year (unchanged).

Whitehall Electric Investments, Ltd., reports a consolidated income for 1949 of £143,425, as compared with £229,036 for the previous nine months, and after deducting directors' fees, management expenses, depreciation of investments, etc., there is a balance of £85,258 (against £99,022). Taxation absorbs £41,580, and after paying the preference dividend, £3,281 is carried forward (against £21,816 brought in).

British Industrial Plastics, Ltd., has declared an interim ordinary dividend of 8 per cent, less tax. For each of the past three years the ordinary distribution has been 20 per cent in one payment.

Associated British Engineering, Ltd., reports a net profit for the year ended 31st March last of £45,699, as compared with £45,631 for the preceding year. General reserve receives £50,000, and it is proposed to pay a final ordinary dividend of 10 per cent, making 16 per cent for the year. The dividend is paid on capital increased by a scrip bonus of £32,000. The balance carried forward is £18,616 (against £48,079 brought in). For the previous year the ordinary dividend was 12 per cent in one payment. The directors state that no consolidated accounts will be presented this year since the company now has only three minor subsidiaries, two of which are not trading and the third is being disposed of.

NEW COMPANIES

Goodman (Fluorescent), Ltd.—Registered 21st April. Capital £1,000. Lighting, electrical, wireless and general engineers, etc. Directors: F. Fraiman and Gertrude M. Gilmour. Regd. office 9, Percy Street, Tottenham Court Road, W.1.

M.G. (Colchester) Electric, Ltd.—Regd. 16th June. Capital £10,000. To acquire the business of electrical and refrigeration engineers and retailers and electrical motor manufacturers carried on by S. A. Martin,

C. E. Goldsmith and S. E. Cawthra at Colchester as M.G. Electrical Co. Directors: S. A. Martin, Mrs. Alice R. Martin, C. E. Goldsmith, Mrs. Joan M. Goldsmith, S. E. Cawthra and Mrs. Evelyn Cawthra. Regd. office: 28, Church Street, Colchester.

William F. Smith & Son (Cardiff), Ltd.—Registered 26th April. Capital £2,000. Manufacturers and repairers of and dealers in dynamos, motors, armatures, magnetos, batteries, etc. Subscribers: Margaret Wakeham and Joan Lewis. Regd. office: 1, Adelaide Place, Cardiff.

Cable Drums Supplies, Ltd.—Registered 14th April. Capital £1,000. Manufacturers of and dealers in cable drums and reels, etc. Directors: D. E. Kaye, D. J. Kaye and D. P. Kaye. Regd. office: Brewery Road, Hoddesdon, Herts.

Duncan-Pope (Wallington), Ltd.—Registered 29th April. Capital £2,000. Electric lamp bulb manufacturers, electrical, mechanical and general engineers, etc. Directors: L. D. Pope and Elizabeth W. Pope. Regd. office: 9, Cavendish Square, W.1.

J. E. Wildbore, Ltd.—Registered 28th April. Capital £5,000. Lighting, electrical, wireless, gramophone and television engineers, electrical installation contractors, etc. Directors: J. E. Wildbore, N. Wildbore and C. M. Wildbore. Regd. office: 6/12, Peter Street, Oldham.

E. & J. Pogson, Ltd.—Registered 10th May. Capital £1,000. Electrical wiring contractors, warping creel manufacturers, stop motion equipment manufacturers, etc. Directors: F. Pogson, E. Pogson, Mrs. Ethel Pogson and J. Pogson. Solicitor: Mary A. Freeman, Slaithwaite.

K. Norton Scott & Co., Ltd.—Registered 10th May. Capital £5,000. To acquire the assets of the business of designers and manufacturers of gas and electrical infra-red ovens, heaters, conveyors and textile drying oven equipment and electrical engineers, carried on by K. N. Scott and T. L. Rawson as the Infra-Red Mfg. Co. at Chadderton, Lancs. Directors: K. N. Scott, and T. L. Rawson. Registered office: 234/248, Fields New Road, Chadderton, Lancs.

Thorpe Electric Co., Ltd.—Registered 5th May. Capital £3,000. Manufacturing, electrical, mechanical and general engineers and contractors, etc. Directors: F. J. Candfield, T. J. Candfield, C. P. Carroll and W. F. Dawes. Secretary: W. F. Dawes, 60, Beech Avenue, Brentford.

Welbeck Electrical Co., Ltd.—Registered 17th May. Capital £100. Electrical, radio, lighting, telephone, mechanical and general engineers and engineering contractors, etc. Directors: J. M. Milne and Mrs. Margaret H. Milne. Regd. office: 32, Strand, W.C.2.

Central Electrical (Bristol), Ltd.—Registered 18th May. Capital £5,000. Electrical engineers and general electrical installation contractors, wireless engineers, etc. Directors: C. R. Setter and J. B. Setter. Reg. offices: 140C, Redland Road, Bristol, 6.

Adams-Wyborn, Ltd.—Registered 31st May. Capital £1,000. Manufacturers and repairers of and dealers in dynamos, motors, cables, etc. Directors: E. J. Wyborn and A. A. Adams. Regd. office: Western Chambers, Station Approach, Hayes, Mdx.

C. Greenhalgh (Electrical), Ltd.—Registered 25th May. Capital £3,000. Wholesale merchants, factors and dealers in electrical, radio, television and telephone appliances and accessories, etc. Directors: C. Greenhalgh and E. Entwistle. Regd. office: 11, Nicholas Street, Burnley, Lancs.

A. D. Dench & Co., Ltd.—Registered 8th June. Capital £2,000. To acquire the business of an electrical engineer and contractor carried on by A. D. Dench at Sutton, Surrey. Directors: A. D. Dench and Mrs. Lilian Dench. Regd. office: 8, Cressingham Grove, Sutton, Surrey.

Decca Radar, Ltd.—Regd. 17th June. Capital £20,000. Manufacturers of and dealers in electronic equipment, including radar, wireless transmitting and receiving, recording, measuring, testing and like apparatus, etc. Subscribers: A. F. A. Powles and K. G. Frow. Regd. office: 1-3, Brixton Road, S.W.9.

BANKRUPTCIES

R. Phœnix, 3, Abbotsford Street, Nottingham, electrical engineer.—Receiving order made 14th June on a creditor's petition. First meeting 30th June at the Official Receiver's office, 22, Regent Street, Park Row, Nottingham. Public examination 3rd August at the County Court House, St. Peter's Gate, Nottingham.

P. Burns, 30, Durward Street, Whitechapel, E.1, electrician, lately carrying on business at 68A, Sidney Street, Commercial Road, London, E.1.—Trustee, Mr. B. Phillips, 76, New Cavendish Street, W.1, released 20th December, 1949.

C. L. Philpott, 55, High Street, Walton-on-Naze, radio and electrical dealer.—First meeting 30th June at 13a, Great Colman Street, Ipswich. Public examination 20th July at the Law Courts, Town Hall, Colchester.

G. Maddison, carrying on business at Church Street, Kidderminster, electrician.—Last day for receiving proofs for dividend 8th July. Trustee, Mr. R. K. Clark, Somerset House, 37, Temple Street, Birmingham, 2, Official Receiver.

FINANCIAL SECTION

STOCKS and SHARES

MARKETS and prices in the Stock Exchange were going ahead in quite satisfactory fashion towards the end of last week, but they suffered an abrupt check from the Korean news. This had the effect of bringing in a certain amount of selling, and prices gave way in most of the markets; as much, perhaps, from precaution on the part of jobbers, as from any pressure to sell on a large scale. Buying orders were withdrawn. An atmosphere of hesitation and uneasiness took the place of the confidence that had previously been apparent. British Government stocks were amongst the weakest spots in the early part of this week; with them, Transport "Threes" and British Electricity "Threes" gave way sharply from their recent best.

Rises and Falls

British Electric Traction deferred stock has been in quiet demand on the increase in the dividend and the satisfactory return on the money which a purchase at the present price affords. The price is now 46o ex dividend. Associated Electrical Industries, 76s 6d, General Electric, 83s 9d, and Chloride, 53s 9d, show gains on the week. Joseph Lucas at 30s 9d are better by the amount of the pence. Falls include Telegraph Construction, 37s 6d, Scottish Cable, 22s 6d, and Tube Investments, £6. De La Rue shares are easier at 23s 3d. Scophony fell 9d to 1s 9d. Electric & Musical dropped, last Monday, from 25s 3d to 23s 6d. Cable & Wireless ordinary weakened to 94½, and Oriental Telephone to 43s 9d.

Electric Construction Dividend

A jump of 8s 9d to 57s 6d in the price of Electric Construction ordinary shares demonstrates the alacrity with which the industrial market is ready to respond to an increased distribution, even on the very restrained scale adopted by this company. From virtually doubled net profits (after tax) shareholders receive a modest 2½ per cent bonus in addition to the 12½ per cent dividend paid annually for the past seven years. At 57s 6d, the £1 shares yield 5½ per cent on the total payment of 15 per cent, payable on capital increased since last year by the issue of 30,000 new shares. These were issued to provide for increased working capital and factory production. The new money has evidently been well employed.

Anglo-Portuguese Telephone

The Anglo-Portuguese Telephone Company has issued £1 million 5 per cent 1st debenture stock 1962-67. The stock was subscribed at 97½ by Telephone & General Trust, and at anything around 100 it is regarded as a sound security. Dealings are expected to begin on Monday, 3rd July, and the stock will be negotiable, at first, free of stamp duty. The shares at 26s 6d are 6d lower on the week.

B.I.C.C. Report

With the annual accounts showing group earnings of 40 per cent to cover the 6⅔ per cent dividend, stockholders of British Insulated Callender's Cables will have few qualms over the chairman's conclusion, in the accompanying report, that the outlook is not so assured as it was a year ago. He referred again to the hardship imposed on stockholders by the dividend limitation agreement: his revenue analysis shows that the stockholders' portion took only 3d last year out of each £1 of turnover. The company has no intention of allowing a temporary and emergency measure to crystallize into a permanent arrangement. The £1 shares are quoted at 32s 6d, to yield £4 2s 3d per cent.

Brush Electrical Capital

A capital issue by Brush Electrical Engineering has been in prospect since the conclusion, eighteen months ago, of the acquisition of subsidiaries from Associated British Engineering, and the subsequent financing of operations, to a comparatively large extent, on bank loans. Arrangements are now in hand to reduce the latter by an offer to stockholders of two new 5s shares at par for each £1 of stock (four 5s units) held. The news had the effect of lowering the price by 6d to 6s.

Aron and Revo

Aron Electricity Meter shares have held their rise to 41s 3d which followed the maintenance of the dividend at 15 per cent and the announcement of a rise in the net profit from £14,000 to £24,000 after tax. In his review, the chairman is satisfied with the present year's trading outlook. The shares are still on the comparatively high yield basis of 7¼ per cent. The return of about 6½ per cent on Revo Electric is also above average. At 42s 6d the shares are 2s lower on the week. The preliminary results were published last week; the distribution for the year was again brought up to 27½ per cent.

ELECTRICITY SUPPLY

Farmers and Rural Development

New Zealand Water Heating Load

A CORRESPONDENT reports that people in the south-west are not taking kindly to the drastic curtailments in the South Western Electricity Board's development scheme. Many farms and hamlets expecting supplies in a matter of months have had plans indefinitely deferred. Many milk producers in the area have been looking forward to supplies for years because they have difficulty in competing with those who have it.

Branches of the National Farmers' Union and some local authorities are still trying to get modifications in the present drastic cuts.

Turkey Hatching

A note in the *Eastern Electricity Bulletin* states that a Norwich district consumer is carrying out an experiment in the hatching of turkeys on a mass-production scale with a new type of incubator of Dutch manufacture. If successful, the experiment may revolutionize turkey hatching in this country, which has hitherto required a large amount of labour to handle a relatively small number of eggs. The total loading is 4 kW with ventilation by means of two ¼ h.p. fans.

New Zealand Statistics

A third of the total electricity consumption in New Zealand in 1948-49 was for water heating (domestic, commercial and dairy). This is shown by a recent survey published by the N.Z. Census and Statistics department. Total sales rose by 11.9 per cent to 2,278 million kWh, and the number of consumers increased by 21,650 to 533,349, sales per consumer averaging 4,271 kWh against 3,978 in the previous year. At the end of the year there were 200,497 ranges, 234,525 water heaters and 37,199 milking machines connected. Revenue from all sources aggregated £12,009,548 and the average price received (retail sales) was 0.829d per kWh sold.

Altogether 2,844 million kWh was generated or purchased during the year, State hydro-electric plants producing 2,512 million kWh. Installed capacity rose from 600,809 to 673,019 kW and route miles of line from 35,527 to 38,341.

Work has begun on the Whakamaru project, fourth in the chain of ten hydro-electric power stations on the Waikato River. The dam is to be built on the gravity principle in contrast to the arch cantilever dams at Karapiro and Maraetai.

Bass Strait Crossing

The prospects of transmitting electric power from Tasmania to the mainland of Australia were considered by Mr. H. P. Moss in a recent issue of the *Electrical Engineer and Merchandiser* (Melbourne), and the subject was later raised in the Commonwealth Parliament. Reviewing the present state of development of submarine power transmission in a subsequent article, Mr. P. E. Williams (London Transport) concludes that it is unlikely that a.c. high-voltage cables will be sufficiently developed to permit the use of such long lengths for many years yet. On long routes like the 350-mile Tasmania-South Australia proposal d.c. cables would undoubtedly be installed. In view of the tremendous advances in h.v. cable design in recent years it would be safe to forecast that cable manufacturers would have little difficulty in providing a cable for a submarine installation scheme which could be justified on economic grounds.

Villages Served by N.C.B.

Durham R.D.C. recently had an interview with officials of the Wear Sub-Area of the North Eastern Electricity Board regarding the supply of electricity to Witton Gilbert and Kimblesworth, at present provided by the National Coal Board. Mr. E. C. Lennox, for the Electricity Board, referred to plans for the Electricity Board to take over supplies at present controlled by the N.C.B. He pointed out, however, that there would be an inevitable delay of some years. He assured the Council that there would be no difficulty in affording a supply of electricity from the Board's network for any housing or industrial developments in the Witton Gilbert area.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1939

26268. Murphy Radio, Ltd., and Hawkins, G. F.—Noise suppression in radio receivers. 31st May, 1948. (641211.)

1945

1603. British Thomson-Houston Co., Ltd. (General Electric Co.).—Fluorescent material. 19th January, 1945. (641212.)

21242. Merles, A. J.—Devices for generating electrical oscillations. 20th August, 1945. (Convention date not granted.) (641344.)

1946

4762. British Thomson-Houston Co., Ltd.—Water-tap attachments. 15th February, 1946. (641215.)

8298. Submarine Signal Co.—Piezo-electric transducer. 18th March, 1946. (641346.)

9373. Centre National de la Recherche Scientifique.—Production of energy through nuclear fission of uranium. 26th March, 1946. (641216.)

20346. Radio Corporation of America.—Electronic scanning methods and apparatus, suitable for colour television and other purposes. 8th July, 1946. (641219.)

33979. Standard Telephones & Cables, Ltd., Moody, N. F., and McCullum, D. M.—Alternating-current impedance bridges. 14th November, 1947. (641351.)

37768. Western Electric Co., Inc.—Phase-shifting devices for wave-guide transmission lines. 23rd December, 1946. (Cognate application 37769, 11th January, 1946.) (641227.)

37866. Igranic Electric Co., Ltd.—Electric supply and control systems for lifting magnets. 24th December, 1946. (641228.)

1947

150. British Thomson-Houston Co., Ltd.—Devices employing spark-discharge gaps to produce illuminating flashes for photographic purposes. 2nd January, 1947. (641229.)

274. Metropolitan-Vickers Electrical Co., Ltd., and Miller, C. W.—Radar display apparatus. 29th December, 1947. (641420.)

549. Haefely & Co., Ltd., E.—Votage-divider for the measurement of high alternating and shock voltages. 7th January, 1947. (641421.)

3995. Thorn Electrical Industries, Ltd., Bullock, V. B., and Strange, J. W.—Moulding of glass envelopes. 9th March, 1948. (641235.)

5455. Rabinowicz, M.—Wireless receiving apparatus. 11th February, 1948. (641236.)

5471. British Thomson-Houston Co., Ltd.—Pulse-echo systems. 25th February, 1947. (641164.)

7147. Standard Telephones & Cables, Ltd.—Flexible electrical connectors for electron-discharge devices. 14th March, 1947. (641165.)

9586. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Electric dry cells. 10th April, 1947. (641427.)

9605. Radio Corporation of America.—Cathode-ray tubes of the signal storing type. 10th April, 1947. (641428.)

9899. Philips Lamps, Ltd.—Circuit arrangements producing direct voltage supplies for cathode-ray tubes. 14th April, 1947. (641430.)

10446. Marconi's Wireless Telegraph Co., Ltd., and Jefferson, H.—Voice and like signal-operated circuit arrangements and devices. 13th January, 1948. (641431.)

13961. Orzabal, R. M.—Self-starting synchronous electric motors. 23rd May, 1947. (641243.)

15357. Gunning, P. F. — Devices responsive to changes in phase relationship of alternating-current circuits. 9th July, 1948. (641244.)

15649. Standard Telephones & Cables, Ltd.—Double current telegraph device. 13th June, 1947. (641245.)

18497. Standard Telephones & Cables, Ltd., and Moody, N. F.—Voltage-limiting arrangements for electric amplifiers. 9th July, 1948. (641356.)

18986. Edison Swan Electric Co., Ltd., and Wilman, D.—Enclosures particularly for street lighting lanterns and other electrical apparatus. 30th June, 1948. (641252.)

21138. Ega Electric, Ltd., and Kilminster, G.—Electric switch gear. 30th July, 1948. (641255.)

22418. Bradley, H. L.—Portable electric igniters. 15th January, 1948. (641445.)

22961. Spanner, E. F.—Feedwater supply systems for steam boilers. 12th August, 1948. (641446.)

23090. General Electric Co., Ltd., and Smyth, J. B. S.—Electrical lighting fittings. 20th August, 1948. (641259.)

26100. Sims, T. W.—Electric safety switches or cut-outs for motor vehicles. 27th September, 1948. (641267.)

27162. Radio Corporation of America.—Photo-electric discharge tube. 20th October, 1947. (641359.)

27414. British Thomson-Houston Co., Ltd.—Alkenyl silane interpolymers. 13th October, 1947. (641268.)

27571. Tym, J.—Electrically heated flat-irons and the like. 14th October, 1948. (641185.)

28536. Rotol, Ltd., and Chilman, J. A.—Means for electrically heating the spinners of airscrews. 19th October, 1948. (641363.)

29133. British Thomson-Houston Co., Ltd.—Electric ranges. 31st October, 1947. (641271.)

30827. Radio Corporation of America.—Frequency multiplying device. 20th November, 1947. (641365.)

31729. Metropolitan-Vickers Electrical Co., Ltd., King, A. J., Maguire, C. R., and Dodds, J. M.—Electric current transformer arrangements. 1st December, 1948. (Cognate application 32876, 12th December, 1947.) (641370.)

32062. Bendix Home Appliances, Inc.—Water inlet systems for washing-machines. 4th December, 1947. (641193.)

33955. Stivin, J.—Devices for the heating of work-pieces by induced high-frequency currents. 23rd December, 1947. (641194.)

34438. Metropolitan-Vickers Electrical Co., Ltd.—Means for supporting the rotors of vertically disposed rotary machines. 29th December, 1947. (641195.)

35333. Boogaard, W.—Snap-action electric push-button switch. 31st December, 1947. (641278.)

1948

31. Philips Electrical, Ltd.—Circuit arrangements for influencing electrically the propagation constant of a network. 1st January, 1948. (641279.)

407. Westinghouse Electric International Co.—Method of producing molybdenum. 6th January, 1948. (641379.)

610. Aluminium Co. of America.—Electrical cables particularly adapted for high-voltage transmission. 8th January, 1948. (Cognate application 611, 17th May, 1947.) (641380.)

1334. Walter Instruments, Ltd., Noad, J. E. G., and Armstrong, C. J.—Rotary electric switches. 14th January, 1949. (641282.)

1335. Walter Instruments, Ltd., Noad, J. E. G., and Armstrong, C. J.—Snap-action electric switches. 14th January, 1949. (641283.)

2462. United Insulator Co., Ltd., and Chlumecky-

Bauer, A. J. P.—Electric capacitors. 26th January, 1949. (641198.)

3023. British Thomson-Houston Co., Ltd.—Electromagnetic relays. 2nd February, 1948. (641287.)

3164. British Thomson-Houston Co., Ltd., and Sinclair, W. D.—Lighting fittings using tubular elongated light sources. 18th January, 1949. (641289.)

3488. Westinghouse Brake & Signal Co., Ltd., Stevens, S. A., and Duckitt, H.—Suppression of voltage surges tending to arise due to the switching of transformers. 2nd December, 1948. (641290.)

3544. Standard Telephones & Cables, Ltd.—Antenna. 6th February, 1948. (641199.)

4472. Reyrolle & Co., Ltd., A., and Bayles, J. W.—Electric arc welding equipment. 11th February, 1949. (641294.)

4482. Holophane, Ltd. (Holophane Co., Inc.).—Street lighting luminaires and refractors therefor. 16th February, 1948. (641386.)

4776. Metropolitan-Vickers Electrical Co., Ltd.—Phase-shifting apparatus. 18th February, 1948. (641387.)

4877. Parsons, Ltd., C. H., and Handley, G. B.—Electric switches. 21st February, 1949. (641296.)

5647. Metropolitan-Vickers Electrical Co., Ltd., Hodgkiss, J. W., and Wilson, J. S.—Fault detecting devices for electric circuits. 11th February, 1949. (641303.)

6784. Compagnie pour la Fabrication des Compteurs et Matérial d'Usines à Gaz.—Colour television systems. 4th March, 1948. (641309.)

8180. Heaton, F., and Heaton, A. R.—Push-button devices for use in controlling electric circuits. 19th March, 1948. (641313.)

13883. British Telecommunications Research, Ltd., and Leigh, R. C.—Arrangements for coupling carrier transmission equipment to transmission lines. 29th April, 1949. (641398.)

16184. Allmanna Svenska Elektriska Aktiebolaget, Andersson, B., and Kops, F. C.—Apparatus for arc stud welding. 16th June, 1948. (641326.)

20304. Ega Electric, Ltd., and Kilminster, G.—Electric switchgear. 30th July, 1948. (Divided out of 641255. (641269.)

20461. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Method of manufacturing electrical condensers. 3rd August, 1948. (641206.)

20529. British Insulated Callender's Cables, Ltd., and Bryce, S. J.—Clamp for securing articles to metal girders. 29th July, 1949. (641334.)

21851. Cossor, Ltd., A. C., and Covill, D. H.—Circuits embodying electron-discharge tubes. 29th July, 1949. (641207.)

23281. British Thomson-Houston Co., Ltd., Hull, J. N. Bellchambers, H. E., and Ruff, H. R.—Electric lighting units of the lay-light type. 29th August, 1949. (641339.)

23812. Allmanna Svenska Elektriska Aktiebolaget.—Dry rectifier valve plate. 10th September, 1948. (641406.)

24447. General Electric Co., Ltd., Power, E. B., and Nelson, E. H.—Seal-bodies in which a conductor is sealed through a vitreous wall. 30th August, 1949. (Addition to 635593.) (641408.)

25028. General Electric Co., Ltd., and Lamont, H. R. L.—Apparatus for analysing the field distribution within circular electric wave-guides. 26th September, 1949. (641208.)

1950

3709. Parsons, Ltd., C. H., and Handley, G. B.—Electric switches. 21st February, 1949. (Divided out of 641296.) (641340.)

Amended Specification

587812. British Thomson-Houston Co., Ltd.—Dielectric wave guide systems.

TRADE MARK APPLICATIONS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within the dates stated.

14th June

ERIE. No. 670,304, Class 9. Resistances, condensers, suppressors, potentiometers and volume controls, all being electrical apparatus.—Erie Resistor, Ltd., 2, Carlisle Road, The Hyde, London, N.W.9.

LOCOMOTORS, LTD. (design). No. 682,291, Class 9. Electrical apparatus and instruments included in Class 9; and advertising apparatus. No. 682,292, Class 11. Installations and apparatus for lighting, heating, steam generating, cooking, refrigerating, drying and ventilating.—Locomotors, Ltd., 154, Grosvenor Road, Westminster, London, S.W.1.

NOVAGLIM. B682,318, Class 9. Electrically illuminated signs.—J. A. Macharg and J. Macharg, trading as the Nova Sign Co., 2, Saville Place, Newcastle-on-Tyne.

PHŒNIX (design). No. 683,286, Class 9. Telephone apparatus and signalling apparatus.—Phœnix Telephone & Electric Works, Ltd., The Hyde, London, N.W.9.

LPA (design). No. B686,250, Class 9. Electrical apparatus and instruments included in Class 9; and radio and telephonic apparatus, and parts, included in Class 9.—The Light & Power Accessories Co., Ltd., Tudor Works, River Park Road, Wood Green, London, N.22.

DAYSTAR. No. 686,903, Class 9. Insulated electric wires.—J. Day & Co. (Derby Works), Ltd., Harrow Manor Way, London, S.E.2.

EKCOMATIC. No. 675,637, Class 21. Small domestic utensils and containers (not of precious metal or coated therewith).—Platers & Stampers, Ltd., Colne Road, Burnley, Lancs.

21st June

E.R. (design). No. 670,305. Class 9. Electrical resistances; condensers, suppressors, potentiometers and volume controls, all being electrical apparatus.—Erie Resistor, Ltd., 2, Carlisle Road, The Hyde, Hendon, London, N.W.9.

WASK. No. 678,748. Class 9. Electrical apparatus and parts, all included in Class 9, but not including apparatus for electrifying wire fencing, burglar alarm systems or alarm bells.—Walter Slingsby & Co., Ltd., Borough Malleable Ironworks, Woodhouse Road, Keighley, Yorks.

GLOBE KING (design). No. 682,180. Class 9. Short-wave radio receiving sets.—A. J. Howarth, trading as Johnsons (Radio), Macclesfield, 102, Palmerston Street, Bollington, nr. Macclesfield, Ches.

EZIOT. No. B642,070. Class 11. Electric water heaters, electric boilers (not parts of machines), and electric radiators.—W. H. Smith, trading as W. H. Smith & Co., 2, Mansfield Street, Church Gate, Leicester.

ELECTRO-FUNDITOR. No. B662,596. Class 11. Electrically operated metal-pot heaters for linotype, intertype and monotype machines.—Funditor, Ltd., Woodbridge House, 3, Woodbridge Street, Clerkenwell Green, London, E.C.1.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section, the date of the issue is given in parentheses.

Australia.—QUEENSLAND.—28th July. Brisbane City Council. Supply of 32 distribution transformers. (C.R.E. (I.B.) 56751/50. Ten/1367.)* 19th July. State Electricity Commission, Queensland. Control equipment for circulating water system, Rockhampton power station. (C.R.E. (I.B.) 56752/50. Ten/1369.)*

Coventry.—12th July. City Council. Electrical installations in 312 flats. (See 23rd June issue.)

Pakistan.—KARACHI.—1st August. Department of Supply and Development. Six 500 kW diesel alternators and two 1,000 kW diesel alternators for Chittagong power station. (C.R.E. (I.B.) 56054/50. Ten/1360.)*

Stretford.—15th July. Town Council. Street lighting cables. (See 23rd June issue.)

Surrey.—17th July. County Council. Street lighting at Egham. (See 23rd June issue.)

Southern Rhodesia.—SALISBURY.—29th September. Electricity Supply Commission. Water tube boiler, superheater, economizer, air heater, mechanical stoker, draught apparatus, piping, etc., for Umniati "B" power station. (C.R.E. (I.B.) 56779/50. Ten/1370.)*

ORDERS PLACED

Australia.—VICTORIA.—State Electricity Commission. High-speed air circuit breaker, d.c., 1,100 V, to Spec. 49-50/199.—Hackbridge & Hewittic Electric Co.

Durham.—County Education Committee. Electrical work at schools:— Blackhill central kitchen (£392).—North Eastern Electricity Board. Sacriston County Boys' School (£300).—R. Keeler.

Haltwhistle.—R.D.C. Electrical installations in forty-four houses on the Redburn estate.—D. Bell, Alnwick.

Houghton-le-Spring (Durham).—U.D.C. Installation of electric street lighting in place of gas on Road A.182 (£1,124).—B. L. Oliver, Birtley.

London.—L.C.C. Installation of wiring and fittings in 268 flats at Dukes Court and York Street, Westminster, and at Shelton Street, Holborn (£5,757).—Arthur Scull & Son, Ltd.

Swansea.—Education Committee. Electrical installation at new grammar school (£8,596).—Lee, Beesley & Co., Ltd.

Sunderland.—Education Committee. Electric lighting in place of gas lighting in schools:—Thomas Street County School (£1,290), Hendon School (£1,375) and James William Street School (£1,130).—Electrical Development Co., Ltd. Diamond Hall School (£1,405), Moor School (£630), and Bishopwearmouth School (£698).—Gee & Brown, Ltd. Hudson Road School (£1,762).—B. French, Ltd.

CONTRACTS IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Cardiff.—Institute and workshops for the blind; C. F. Jones, architect, 67, Queen Street.

Carlisle.—Technical college, Strand Road (£213,700); John Laing & Son, builders, Carlisle.

Carlton.—Flats (20), Cavendish Road, for U.D.C.; M. D. Sweeney & Palmer, Ltd., Beechdale Road, Aspley, Notts.

Castle Ward.—Houses (26), Stamfordham housing site, for the R.D.C.; J. Bolton, surveyor, Council Offices, North Road, Ponteland.

Cheltenham.—Houses (650), Arle estate; borough surveyor, Municipal Offices.

Cheshire.—Adaptation of "Kilrie," Knutsford, as reception centre and short-stay home (£12,000); county architect, Chester.

Colne.—Houses (22), Derker Avenue, Marsden, for U.D.C.; Holroyd, Brook & Englands, Ltd., Slaithwaite.

Colwyn Bay.—Theatre, conference hall and extensions to pier; borough surveyor.

Coventry.—Flats (60) and garages (51), Quinton Park; Geo. Wimpey & Co., Ltd., builders, Chester Road, Castle Bromwich.

Crawley.—Factory for A.P.V. Co., Ltd., Wandsworth Park, S.W.18.

Dewsbury.—Houses (128); Harlow & Milner, Ltd., Wakefield.

Durham.—Pithead baths at Tursdale Colliery, Cassop; National Coal Board, Queen Square, Newcastle-on-Tyne.

Additions to Stanley Grammar School (£50,000); W. Moss & Sons, builders, St. Mary's Place, Newcastle-on-Tyne.

Enfield.—Works extensions for Enfield Metal Works, Ltd.; W. Mitchell & Son, architects, 86, Crossbrook Street, Waltham Cross.

Ewell.—County secondary school, first stage (£99,651); Surrey county architect, Kingston-on-Thames.

Gateshead.—Flats (24), Park Lane estate; chief architect, Municipal Buildings.

Hemel Hempstead. — Secondary school (£176,122); Fairweather & Jordan, architects, 28, Wigmore Street, London, W.1.

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, S.W.1 (Victoria 9040).

Herne Bay.—Primary school, Herne Bay West (£65,000); W. R. H. Gardner, architect, 2, Cecil Square, Margate.

Hove.—Shops (6), with flats above, and 16 garages, Sunninghill; borough surveyor.

Kendal.—Houses (50), Hallgarth estate; W. H. Ainsworth & Co., Mints Feet Road.

Kesteven.—Hostel block at Stoke Rochford Training College; county architect, Sleaford.

Hull.—Cinema-theatre; Goddard & Smith, 22, King Street, St. James's, London, S.W.1.

Lancashire. — Branch library at Orrell (£12,500); G. Noel Hill, County Offices, Preston.

Leeds.—Houses (32), Moortown; Robert R. Roberts (Leeds), Ltd., 122, Lower Wortley Road.

School, Spen Lane (£193,671); M. Harrison & Co., Ltd., contractors, Post Hill Quarries, Farnley, Leeds.

London.—CHISWICK.—Block of nine dwellings, Chesterfield Road; borough engineer, Town Hall, Chiswick, W.4.

GREENWICH.—Flats (94) in four-storey and three three-storey blocks, 64 houses, etc., Brook Lane site; P. W. Burnett & Partners, architects, 12, Bloomsbury Square, W.C.1.

BATTERSEA.—Flats (210), Patmore Street site, for L.C.C.; De Metz & Birks, architects, 2, Ludgate Hill, E.C.4.

Maidstone.—Dwellings (34), Staplehurst and Linton, for R.D.C.; J. H. Nicholson, surveyor, 26, Tonbridge Road.

Mansfield Woodhouse.—Houses (72), Coxs Lane estate; C. H. Hill & Sons, Ltd., Mansfield.

Nant Conway.—Houses (40); E. Williams, surveyor to R.D.C.

Newcastle-on-Tyne.—Houses, Montagu site (158), and Victoria Avenue, Longbenton (39); William Leech, Ltd., builders, 2, Clayton Street.

North Riding.—Headquarters at Northallerton for the police mobile control (£25,000); county architect, County Hall, Northallerton.

Grangetown county primary infants' school (£47,000); Scarborough Eastfield primary school (£47,200); and Whitby county modern school (£165,000); county architect.

Oxford.—Houses (154), Northay estate; John Laing & Son, Ltd., Bunns Lane, N.W.7.

Paisley.—Houses (180), Glenburn, for T.C.; burgh surveyor.

Peterlee (Co. Durham).—Houses (250) for the Peterlee Development Corporation, Shotton Hall, Castle Eden.

Plymouth.—Repository for J. L. Russell Stores, Ltd., 19, Russell Street.

Portsmouth.—Crematorium, etc. (£40,280); city engineer, 1, Clarence Parade, Southsea.

Reading.—Shops and offices, Friar Street and Station Road; Prudential Assurance Co., Ltd., Holborn Bars, E.C.1.

Factory, Basingstoke Road; Bradley & Bliss, Ltd., 6, London Street.

Richmond (Yorks).—Houses (12), St. Martins, for R.D.C.; Boddy & Bell, Thomas Street, Darlington.

St. Albans.—Mill extensions (£100,000) for Ballito Hosiery Mills, Ltd., Hatfield Road; Blow & Peters, contractors, £2, London Road, St. Albans.

St. Helens.—Factory premises at Parr for Tootal Broadhurst Lee & Co., Ltd.; W. Thornton & Sons, contractors, 38, Wellington Street, Liverpool.

Salford.—Flats (264), Ladywell; Unit Construction Co., Ltd., Knutsford, Cheshire.

Seisdon.—Houses (30), Moat Brook Avenue, for R.D.C.; G. Wright & Co., Ltd., 10, Union Mill Street, Wolverhampton.

Sheffield.—Junior and infants' school at Totley; city architect.

Shrewsbury.—Extensions to fire brigade headquarters, including second storey, for Salop C.C.; A. G. Chant, county architect, Column House, London Road, Shrewsbury.

Smethwick.—Infants' school, rear of Abbey Road and Hamilton Road; borough surveyor, Council House.

Stafford. — Houses (300), Manor estate; borough surveyor.

Stamford (Lincs).—Houses (54), Drift Road estate; Morton Potteries, Ltd., Leicester.

Staveley.—Houses (72) for U.D.C.; J. A. Belfitt & Co., Ltd., Sheffield.

Stockport.—Flats at Covent Garden and Banbury Street; H. S. Fairhurst & Son, architects, 55, Brown Street, Manchester.

Stockton-on-Tees.—Bungalows (54), Roseworth; borough architect, 28, The Square.

Swansea.—Central fire station and offices (£104,000); borough architect.

Tamworth.—Houses (50), Fazeley Road housing site; borough engineer, Municipal Offices.

Todmorden.—Workshop block and classroom at technical institute (£125,000); West Riding county architect, Wakefield.

Towcester.—Houses (14) for R.D.C.; Frederick Lack, Ltd., 33, Edinburgh Road, Nottingham.

Tow Law.—Houses (28) for the North-Eastern Housing Association, Metrovick House, Northumberland Road, Newcastle-on-Tyne.

Tynemouth.—Sixteen flats in Biddlestone Crescent; J. G. Thompson & Sons, builders, 28, Fowler Street, South Shields.

Urmston.—Dwellings (475), Woodsend Estate South, for U.D.C.; surveyor, Crofts Bank Road.

Wallsend.—Houses (54), Low Willington; borough engineer.

Warwickshire.—Primary school, Middlemarch, Nuneaton (£31,500), and infants' school, Kineton Green, Solihull (£25,000); county architect, Warwick.

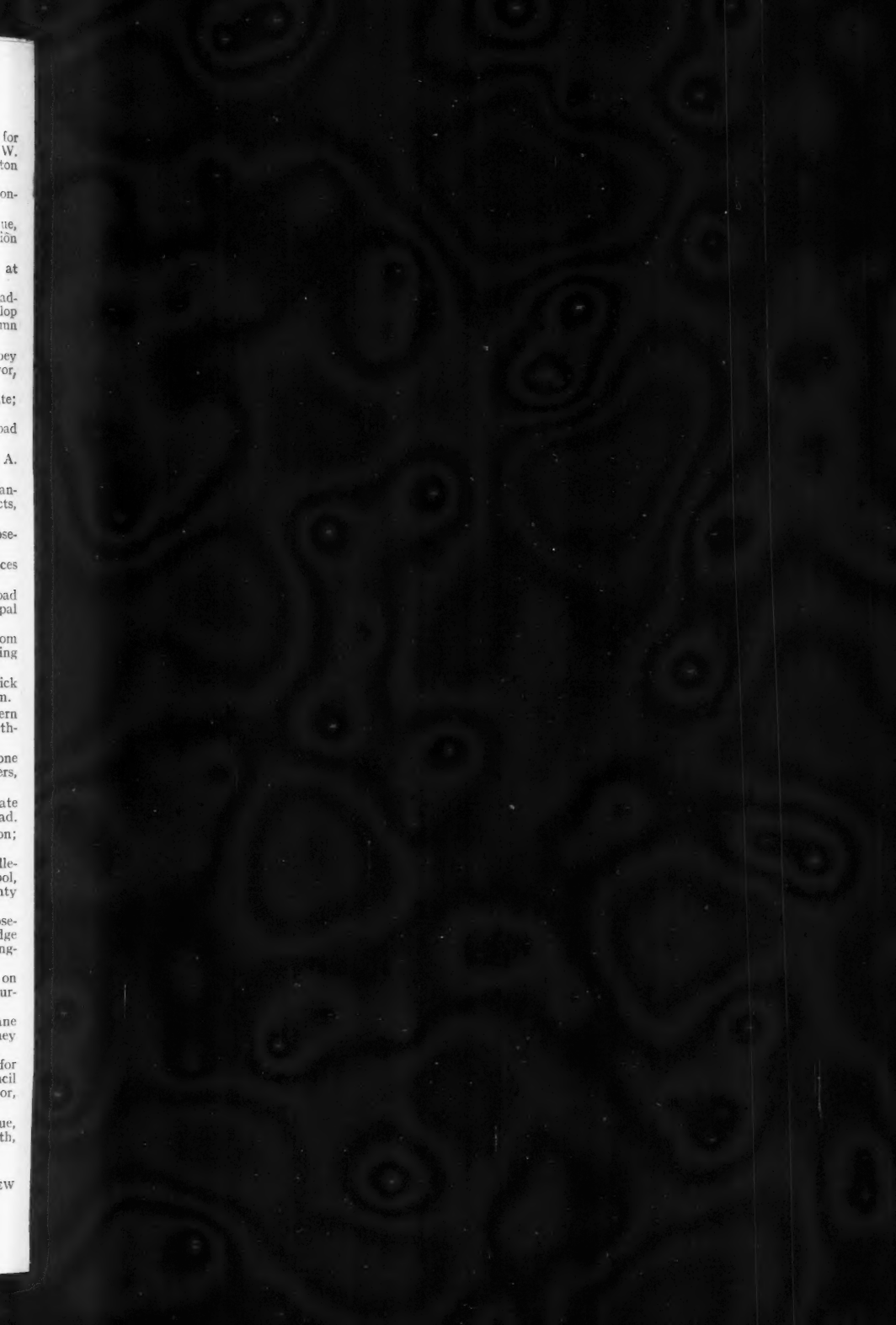
Wenlock.—Houses (16) at New Road, Broseley; J. Brian Cooper, architect, Coleridge Chambers, 177, Corporation Street, Birmingham, 4.

West Bromwich.—Houses and flats (142) on an estate adjoining Coles Lane; borough surveyor, Town Hall.

Weymouth.—Houses (54), Rylands Lane estate; borough surveyor, 6, Pulteney Buildings.

Whiston.—Stores, offices, workshop, etc., for central works depot, site adjoining Council Offices for R.D.C.; Watson Garbutt, surveyor, Prescot, near Liverpool.

Whitley Bay.—Houses (32), Cotswold Avenue, Foxhunters site, for the U.D.C.; J. W. Urpeth, builder, Bedlington.



ELECTRICAL REVIEW

ONE SHILLING — 30th JUNE, 1950

THE

AUTO-MEMOTA

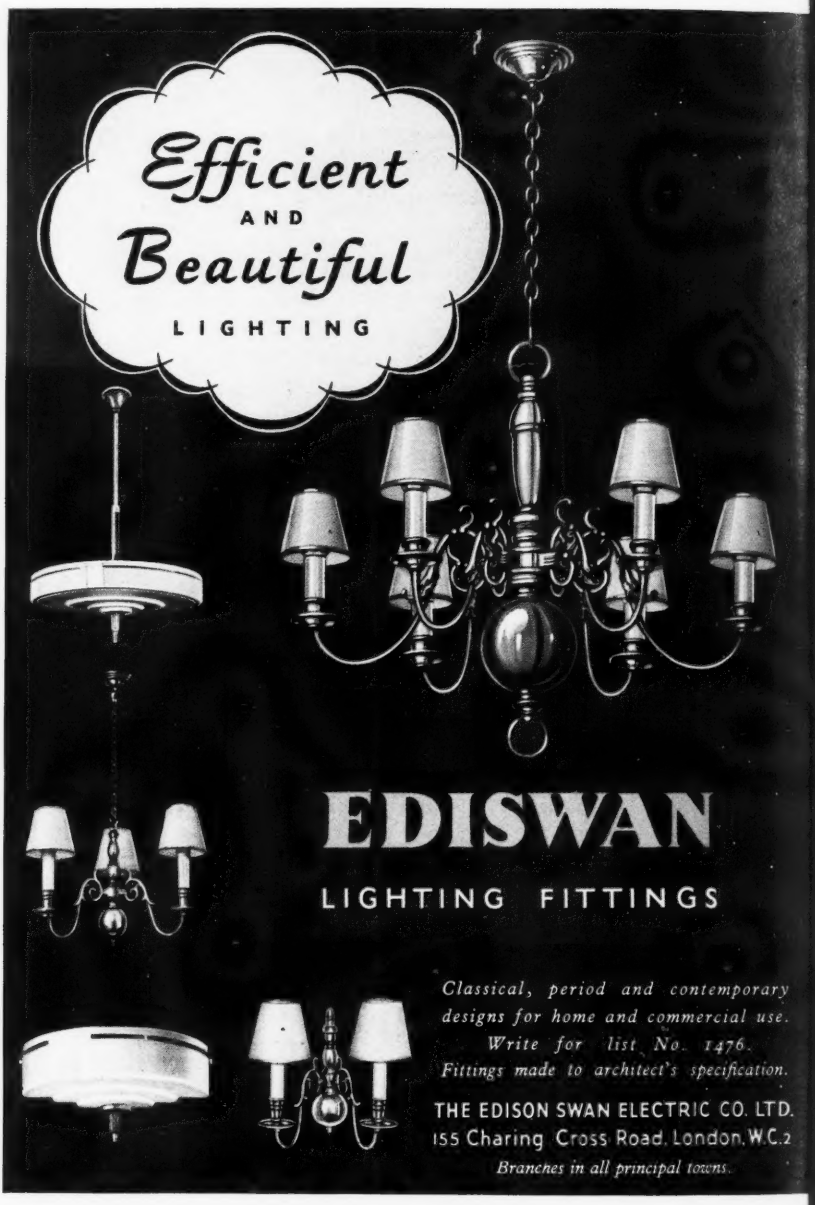
COMES OUT WITH FLYING COLOURS

Put the new 'Auto-Memota' up against any other starter and it comes out with flying colours. From its new style case to its gold and silver contacts it is the last word in automatic motor control equipment. For your next motor order 'Auto-Memota'. You can now get prompt delivery.

MEM — Switch, fuse and motor control gear, electric fires and localised lighting equipment

Send for list No. 300 for details of MEM direct-on, reversing, star-delta and hand reset starters.

MIDLAND ELECTRIC MANUFACTURING CO. LTD • BIRMINGHAM 11


Efficient
AND
Beautiful
LIGHTING
EDISWAN
LIGHTING FITTINGS
Classical, period and contemporary designs for home and commercial use.
Write for list No. 1476.
Fittings made to architect's specification.
THE EDISON SWAN ELECTRIC CO. LTD.
155 Charing Cross Road, London, W.C.2
Branches in all principal towns.